Analysis of Brownfield Cleanup Alternatives Rev. 1

Former Sanitary Laundry Property

625 North Broadway, Knoxville, Tennessee

S&ME Project No. 4143-17-016

EPA Brownfields Cooperative

Agreement No. BF-00D47816-0

PREPARED FOR:

City of Knoxville Office of Redevelopment

400 Main Street, Suite 655

Knoxville, Tennessee 37902

PREPARED BY:

S&ME, Inc.

6515 Nightingale Lane

Knoxville, TN 37909

April 3, 2019

April 3, 2019

City of Knoxville Office of Redevelopment
400 Main Street, Suite 655
Knoxville, Tennessee 37902

Attention: Ms. Anne Wallace

Reference: **Analysis of Brownfield Cleanup Alternatives Rev. 1**
Former Sanitary Laundry Property
625 North Broadway
Knoxville, Tennessee
EPA Brownfields Cooperative Agreement No. BF-00D47816-0
S&ME Project No. 4143-17-016

Dear Anne:

S&ME, Inc. (S&ME) has updated the Analysis of Brownfield Cleanup Alternatives (ABCA) to supplement the document previously prepared by S&ME (*Analysis of Brownfields Cleanup Alternatives* dated September 10, 2015) for the Former Sanitary Laundry Site located in Knoxville, Tennessee. This ABCA was prepared under a Brownfields Cleanup Grant provided by the United States Environmental Protection Agency (EPA), Region 4, under EPA Brownfields Cooperative Agreement No. BF-00D47816-0. S&ME appreciates this opportunity to be of service to you. Please call if you have questions concerning this report or any of our services.

Sincerely,

S&ME, Inc.

Elizabeth Porter, PG, PMP
Project Manager

James R. Bruce, PG, CHMM
Quality Assurance Officer

CC: Olga Perry, USEPA
Justin Fisher, TDEC Knoxville
Paula Middlebrooks, TDEC

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1.0 Introduction

S&ME, Inc. (S&ME) has completed an updated Analysis of Brownfield Cleanup Alternatives (ABCA) for the Former Sanitary Laundry property located at 625 North Broadway in Knoxville, Tennessee (Figure 1, Appendix I). The purpose of the updated ABCA is to briefly summarize information about the site and contamination issues, cleanup standards, applicable regulatory requirements, cleanup alternatives considered, and proposed cleanup alternative(s). This document was prepared under a Brownfields Cleanup Grant provided by the United States Environmental Protection Agency (EPA), Region 4, under EPA Brownfields Cooperative Agreement No. BF-00D47816-0, and supplements the ABCA previously prepared by S&ME (*Analysis of Brownfields Cleanup Alternatives* dated September 10, 2015).

2.0 General Site Information

The former Sanitary Laundry property consists of one parcel containing approximately 0.3 acre, owned by the City of Knoxville (City), and located at 625 North Broadway in Knoxville, Tennessee (Figures 1 and 2, Appendix I). The property center is located at 35.975358° N latitude and -83.924359° W longitude. The property is identified on the Knox County Tax Assessor's Tax Map as Tax Map 94D, Group P, Parcel 13.

The property is occupied by a currently vacant, 30,000 square-foot structure used for dry cleaning operations between 1926 and 1993. The 30,000 square-foot building occupies two levels, each approximately 15,000 square feet. The general topographic slope in the vicinity of the site is down to the northwest. Published geologic information indicates that the site is underlain by bedrock of the Bays Formation of the Chickamauga Group. This formation is primarily composed of calcareous mudstone and siltstone that is maroon in color and the upper portion is commonly mottled with sandstone and metabentonite. The Bays Formation commonly weathers to produce a thin silty, sandy residual soil.

3.0 Site Assessment Activities

S&ME previously generated the following reports to document site assessment activities:

- *S&ME Report of Phase I Environmental Site Assessment*, *Former Sanitary Laundry and Dry Cleaning Property*, July 31, 2013
- *S&ME Report of Phase II Environmental Site Assessment, Former Sanitary Laundry Property*, September 12, 2014
- *S&ME Report of Limited Asbestos and Lead-Based Paint Survey, 625 North Broadway Former Sanitary Laundry Facility*, October 22, 2014

Numerous additional reports and site-related documents are available in the extensive Tennessee Department of Environment and Conservation (TDEC) regulatory files. It is worthwhile to note that the reports referenced above

and present in the TDEC files include both the parcel at 625 North Broadway and the parcel at 750-760 Stone Street, located west and adjacent to the subject property, and part of the former Sanitary Laundry operation. The parcel at 750-760 Stone Street contained the boiler house and a loading and vehicle maintenance building. The Stone Street parcel is currently owned by others and is excluded from the proposed cleanup activities.

As summarized in the referenced reports and previous documentation available in TDEC files, one dry cleaning solvent and two gasoline underground storage tanks (UST) utilized by the dry cleaner were located on the property or on the Stone Street parcel behind the building, which was also former Sanitary Laundry property. The gasoline USTs were permanently closed by removal in 1993. The dry cleaning UST was emptied in 1994 but remains on the property, behind the building. TDEC Division of Remediation (DOR) personnel (Ms. Erin Sutton and Mr. Dan Hawkins) have indicated that the dry cleaning solvent tank was filled with concrete sometime in the 1990's. TDEC records reviewed previously by S&ME confirm that in 1994, the tank that previously held dry cleaning solvent was emptied and subsequently filled with concrete.

Minor staining of the concrete floor was observed throughout the building during the Phase I Environmental Site Assessment (ESA) site reconnaissance. A loading dock was observed on the west side of the building. A large boiler was observed on the northeast portion of the building. An adjoining elevated concrete trough was also observed. The past use of this trough was not evident based on site observations. Steam piping used in the dry cleaning process was also observed throughout the building.

Soil and groundwater investigations have identified soil and groundwater contaminated with dry cleaning compounds, solvents, and petroleum products. The Phase I ESA documented evidence of recognized environmental conditions (RECs) relative to former uses of the subject property. The RECs documented in the Phase I ESA include:

- The subject property operated as a dry cleaner from 1926 until 1993.
- The subject property was identified on multiple regulatory databases.
- Dry cleaning compounds and solvents at concentrations that exceed primary drinking water Maximum Contaminant Levels (MCLs) have been detected in groundwater.
- Two gasoline USTs and one heating oil aboveground storage tank (AST) have been located on or behind the subject property in the past (on the 750-760 Stone Street parcel).
- Evidence of one dry cleaning solvent UST was observed on the subject property. The contents of the UST were reportedly removed in 1994 but no soil testing was documented at that time.
- Numerous 55 gallon drums of dry cleaning fluids and oil were observed and removed from the Sanitary Laundry property in 1999.
- Two groundwater monitoring wells are located in the courtyard area west of the North Broadway building.
- One in-ground hydraulic lift was observed in the garage building behind the subject property (on the 750-760 Stone Street parcel).
- The subject property was placed on the State Superfund list in 1994.

In 1994, the subject property was added to the List of Inactive Hazardous Substance Sites by action of the Tennessee Solid Waste Disposal Control Board. The subject property was identified as Site No. 47-545, Sanitary

Laundry and Dry Cleaners. A Notice of a Hazardous Substance Site was filed with the Knox County Register's Office in 1997. An Imminent, Substantial Danger Memorandum was issued by the TDEC Commissioner in 1999, due to the presence of multiple 55-gallon drums of hazardous substances on-site. TDEC initiated emergency removal actions in 1994, and again in 1999, addressing the USTs and two barrels of dry cleaning fluid in 1994, and implementing an emergency removal of the drums in 1999.

Based on the Phase I ESA findings, in 2014 S&ME conducted a Phase II ESA on behalf of the City to determine the nature and extent of subsurface contamination resulting from past use of the property. The Phase II ESA consisted of the collection and laboratory analysis of 34 passive soil vapor modules, subsurface soil samples, groundwater samples, soil gas samples and ambient air samples from the former Sanitary Laundry property, which included the subject site and the west adjacent parcel formerly owned by Sanitary Laundry. A Geoprobe® rig was used to obtain subsurface soil for field and laboratory analyses. Groundwater samples were collected from two existing monitoring wells and from six piezometers installed during the Phase II ESA sampling.

The analysis of soil samples revealed arsenic concentrations in 14 samples that exceed the EPA May 2014 Residential Soil Regional Screening Level (RSL), and 13 samples that exceed the Industrial Soil RSL for arsenic. However, the reported arsenic concentrations did not vary significantly with depth or location and are therefore interpreted as naturally-occurring background. Of the volatile organic compounds (VOC) and polynuclear aromatic hydrocarbon (PAH) compounds detected in soil samples, only tetrachloroethylene (PCE) and benzo(a)pyrene exceed respective Residential Soil RSLs. None of the reported VOC or PAH concentrations exceed Industrial Soil RSLs.

Concentrations of petroleum hydrocarbons (extractable petroleum hydrocarbons (EPH), and total petroleum hydrocarbons (TPH)) that exceeded the TDEC Division of Solid Waste Management (DSWM) clean fill criteria of 100 milligrams per kilogram (mg/kg) were reported in soil samples collected from within the Sanitary Laundry building, the former auto repair building (west adjacent parcel) and the former UST locations (west adjacent parcel).

Arsenic concentrations detected in groundwater samples exceeded the corresponding arsenic Tapwater RSL. Lead concentrations detected in each groundwater sample exceed the EPA drinking water MCL. Concentrations of benzene and the chlorinated solvents PCE, trichloroethylene (TCE), cis-1,2-dichloroethene and vinyl chloride which exceeded the EPA May 2014 Tapwater RSLs and MCLs were detected in groundwater samples. Also notable was the detection of 1,2-dichlorobenzene, ethylbenzene, naphthalene, n-propylbenzene, the trimethylbenzene isomers, and xylenes in concentrations that exceed the EPA May 2014 Tapwater RSLs.

The eight soil gas samples collected during the 2014 Phase II ESA reported concentrations of benzene, ethylbenzene, carbon tetrachloride, chloroform, PCE, TCE, 1,1-dichloroethane, 1,1-dichloroethene, and vinyl chloride that exceed the respective EPA May 2014 Residential and/or Industrial Air RSLs. It is notable that PCE concentrations exceeded the Industrial Air RSL by up to three orders of magnitude in sub-slab samples. PCE and TCE concentrations were reported in the soil gas below the building with maximum concentrations of 68,000 micrograms per cubic meter (µg/m^3) and 10,000 µg/m^3, respectively.

Ambient air sampling resulted in concentrations of benzene, carbon tetrachloride, chloroform, chloromethane, ethylbenzene, PCE and TCE that exceed Residential and Industrial Air RSLs. The highest chloromethane, ethylbenzene, PCE and TCE concentrations were reported for air samples collected in the former main Sanitary Laundry building, which occupies the subject property. A maximum concentration of PCE in ambient air was detected at 46 µg/m^3, and TCE was detected at 6.4 µg/m^3. Ambient air samples collected by TDEC on April 1, 2015 in the adjoining buildings tested positive for solvents, but at concentrations that TDEC indicated were "significantly below our risk based remedial goals."

The TDEC DOR has been involved with this site in a regulatory capacity for many years. In an effort to support the City's redevelopment efforts, and to secure an approach to site redevelopment that is consistent with applicable regulations, TDEC has executed a Brownfield Voluntary Agreement (BVA) (Site No. 47-545) for the subject property. TDEC and the City have agreed that the BVA is to be made a condition of sale of the property. The BVA established for the site requires a vapor mitigation system to be incorporated for any building construction or renovation on the property to address those chemical constituents identified in previous assessment activities. The goal of the soil vapor mitigation system would be to break the exposure pathway for vapor migration.

The City recently replaced the roof on the former Sanitary Laundry property. Based on the historic significance of the site, and the investment in improving the existing structure, redevelopment using existing foundations is the preferred option for site redevelopment, rather than demolishing the existing structure and foundations. In order to support this method of site redevelopment, a vapor mitigation system is warranted to mitigate those chemical constituents identified in previous assessment activities that exceed relevant regulatory comparison criteria. The building currently has some broken windows, as well as holes in the floor that allow air movement between the basement and the first floor. In addition, there is currently not a heating or cooling system operating in the building, and a design for the redevelopment of the structure has not yet been proposed. Because of the current conditions within this vacant building, TDEC recommended that ambient air samples not be collected at this time, as the results would not reflect typical conditions if the building was occupied. Therefore, to gather current site information to support the vapor mitigation system design, S&ME updated the sub-slab soil gas evaluation, and added flux chamber samples to provide supplemental data for design purposes. Specifically, S&ME collected 12 soil gas samples (including one field duplicate) and six flux chamber samples from the site to update the data for VOCs at the site. In addition, S&ME utilized two subcontractors, Clean Vapor LLC (Clean Vapor) and Radon 1 to perform sub-slab communication testing and prepare system designs.

Constituent concentrations detected in the 2018 sub-slab gas and flux chamber samples were compared to the May 2018 EPA RSLs for industrial and residential air (Target Carcinogenic Risk (TCR) = $1x10^{-6}$ and a Target Hazard Quotient for Non-carcinogens (THQ) = 0.1)). Where detected sub-slab constituents exceeded the corresponding target soil gas concentrations, they also were evaluated for vapor intrusion (VI) hazard and VI Carcinogenic Risk using the Office of Solid Waste and Emergency Response (OSWER) Vapor Intrusion Screening Level (VISL) Calculator (Version 3.5, June 2017), with a TCR = $1x10^{-6}$ and a THQ = 0.1 under a commercial land use scenario, adjusted using a factor of 0.03 to account for attenuation. The residential land use scenario was not evaluated, because based on current and historic contaminant levels, the VISL findings under a commercial scenario, the BVA, TDEC input and current City plans, the site is anticipated to be limited to commercial uses.

Each of the sub-slab gas samples (SS-1 through SS-12 and one field duplicate) was analyzed for VOCs by EPA Method Toxic Organics-15 (TO-15). Nineteen analytes exceeded both Residential and Industrial RSLs in at least one sample, and PCE exceeded the industrial RSL in each of the 12 samples and the duplicate, with a maximum detected concentration of 303,000 µg/m^3 in sample sub-slab sample SS-4.

The analytical results from the flux chamber sampling reported concentrations of 12 analytes which exceeded the Residential Air RSLs and eight analytes which exceeded the industrial RSLs. The flux chamber samples generally demonstrated lower VOC concentrations than the nearby sub-slab samples, as would be expected. There was generally no strong correlation between the flux chamber samples collected over cracks vs. the flux chamber samples collected over concrete.

The results of VISL screening using the sub-slab soil gas results under a commercial scenario identified a VI Carcinogenic Risk in excess of the TCR (1 x 10^{-6}) for chloroform, 1,2-dichloroethane, 1,1,1,2-tetrachloroethane, PCE, 1,1,2-trichloroethane, TCE, and vinyl chloride. A VI Hazard was identified in excess of the THQ (0.1) for 1,2-dichloroethane, TCE, PCE, 1,1,2-trichloroethane and vinyl chloride.

Based on the findings of the S&ME Phase II assessment activities, S&ME provided the analytical results to Clean Vapor and Radon 1, firms specializing in the design and installation of vapor mitigation systems. Both firms performed additional diagnostics testing and provided a mitigation plan design based on their building and subsurface diagnostics.

From June 11 to June 12, 2018, sub-slab pressure field extension testing was performed by Clean Vapor to support their design of a vapor intrusion mitigation system (VIMS) intended to induce a negative pressure field under the slab of the building, so that sub-slab vapors will be unlikely to migrate upward into the building. A second estimate was requested by TDEC, and on November 7, 2018, Radon 1 preformed their onsite sub-slab pressure field extension testing used to support their design. The Clean Vapor and Radon 1 designs are further presented in Section 6.

As part of the cleanup planning effort, S&ME also collected a sample of the black granular material stored in and around several 55-gallon steel drums currently located in the boiler room in the basement, for disposal characterization purposes. The sample was collected on April 16, 2018, and submitted to ESC Laboratory in Mt. Juliet, Tennessee for analysis of target compound list/target analyte list and toxicity characteristic leaching procedure analytical parameters, along with EPH. Metals and low level benzo(b)fluoranthrene and fluoranthene were detected, and the results were used to obtain a quote for disposal of this material. The analytical laboratory report is located in Appendix II.

4.0 Applicable Regulatory and Cleanup Standards

As mentioned previously, the TDEC DOR has been involved with this site for many years. In an effort to support the City's redevelopment efforts, and to insure that site redevelopment is performed in accordance with applicable regulations, TDEC prepared the draft BVA (Site No. 47-545). TDEC and the City have agreed that the BVA is to be made a condition of sale of the property. A copy of the draft BVA is included in Appendix III and should be

reviewed for an understanding of the TDEC requirements for the subject property redevelopment. Some of the terms and conditions pertaining to property redevelopment are summarized herein:

- Prior to any part of the Property being used for a residence, domicile, daycare, school, or church, the Grantor, its successors, and/or assigns must notify TDEC DOR and must demonstrate to the satisfaction of TDEC DOR that any such proposed use listed above will not pose a danger to public health, safety, or the environment.
- Prior to the removal of soil at the Property, the Grantor, its successors, and/or assigns must notify TDEC DOR and must demonstrate to the satisfaction of TDEC DOR that any such proposed soil removal will not pose a danger to public health, safety, or the environment.
- The Grantor, its successors, and/or assigns must notify TDEC DOR prior to any invasive activity on the Property including soil borings or potable groundwater wells. The Grantor, its successors, and/or assigns must demonstrate to the satisfaction of TDEC DOR, through sampling and analysis approved by TDEC DOR, that any invasive activity will not pose a danger to public health, safety, or the environment.
- Any new building construction on the property shall incorporate a vapor mitigation system designed to prevent subsurface vapor phase contamination from migrating into the structure at concentrations greater than applicable regulatory comparison criteria. Said vapor mitigation system plans shall be developed by a TDEC-approved remediation contractor and provided to the TDEC Division of Remediation for review prior to construction. After installation, the TDEC-approved contractor shall submit a written report to the TDEC Division of Remediation documenting how the system was installed, any deviations from the TDEC-reviewed plan, as built drawings, and an Operation and Maintenance Plan identifying continued care and operation and maintenance activities to be conducted to ensure the venting system is effective in preventing subsurface vapor phase contamination from migrating into the structure at concentrations greater than applicable screening levels.
- The Grantor, its successors, and/or assigns shall be responsible for continued care, operation, and maintenance of the remedy. The Grantor, its successors, and/or assigns shall notify TDEC DOR in writing if the integrity of the remedy is compromised and take any steps necessary to eliminate the threat or potential threat to public health, safety, or the environment posed by the hazardous substance(s).
- The Voluntary Party agrees that criteria required in Tennessee Code Annotated (TCA) 68-212-206(d) shall be used in determining containment and cleanup actions, including monitoring and maintenance options to be followed under this Agreement.
- The Voluntary Party agrees to prepare a Soil Management Plan (SMP) for DOR approval prior to the commencement of construction activities. The SMP will include, but not be limited to, procedures for temporary staging or containerization and characterization of any excavated materials, handling to ensure that any offsite disposal of impacted media meets all State and Federal requirements, and, if needed, installation of a barrier or engineered cap. A Health and Safety Plan shall be submitted to the DOR for review and comment.
- The Voluntary Party agrees to perform the work set forth in the SMP and the Voluntary Party shall submit a written report of its findings to the DOR within 90 days of completion of such work. The report shall include, but not be limited to, as-built drawings, details of any capping, and waste

manifests for offsite disposal. The report shall also identify any areas where soil remains at the subject property that must be managed in the future to protect human health, safety, or the environment and requirements for future soil management and maintenance of any covers or caps.

- The Voluntary Party agrees that it will file any land use restriction identified by the DOR as necessary for the safe use of the property in accordance with TCA 68-212-225.

5.0 Cleanup Activities to Date

Prior to and during the Phase II ESA sub-slab and flux chamber sampling activities, several other cleanup related tasks were accomplished at the site, as documented herein.

1. Between December 18, 2017 and December 29, 2017, NEO Corporation (NEO) abated approximately 895 linear feet (LF) of asbestos-containing thermal system insulation (TSI), 1,665 square feet (SF) of floor tile/mastic, 800 SF of ceiling cork board, and 400 SF of boiler wrap at the site. NEO Corporation utilized negative pressure, wet glove bag methods, high-efficiency particulate air (HEPA) vacuum, and a prompt clean up. NEO performed a final inspection of the jobsite upon completion, and fine cleaning was performed after the asbestos abatement. All waste was double-bagged and disposed of in an approved landfill for asbestos-containing materials. All asbestos was removed according to local, state, and federal regulations. The NEO Asbestos Abatement Final Submittal dated January 8, 2018 is included in Appendix IV.

2. In January 2018, crews from the City removed and disposed of 21.26 tons (estimated 42,520 pounds) of solid waste previously stored in the basement of the Sanitary Laundry building. The material was removed by the City Solid Waste/Household Hazardous Waste Departments, and processed through their waste disposal program. The material included pallets of paint, antifreeze, sealants, etc., as well as various building materials stockpiled in the basement.

3. During the roof renovation performed by others, the roofing contractor cut two holes in the basement floor and one hole in the pavement outside of the building to accommodate proposed installation of the roof drains. Upon learning of this activity, the City instructed the contractor to stop sub-slab excavations and contacted S&ME, and an alternative approach for the roof drain installations was established. This activity was handled outside of the Brownfield Cleanup Grant, with the exception of the drum sampling performed on January 30, 2018 to characterize the soil excavated by the roofing contractor and placed into three 55-gallon steel drums by S&ME to manage the material. The soil samples detected VOCs consistent with the previous site characterization activities. The three drums were removed for proper disposal as special waste by Domermuth Environmental Services, located Knoxville, Tennessee. Copies of the corresponding analytical report and non-hazardous disposal manifest are located in Appendices II and IV, respectively.

6.0 Evaluation of Cleanup Alternatives

The City and TDEC DOR previously provided input on the proposed cleanup alternatives for the subject property, assuming that the site will be redeveloped for retail or commercial purposes. Prior to any redevelopment activities, S&ME and the City recommend that any storage containers or above ground tanks or vessels previously used in the former operations at the property be removed and disposed of in accordance with applicable regulations. In addition, S&ME previously recommended removal of asbestos and lead-based paint (LBP) within the structure in accordance with applicable regulations. As discussed in Section 5, the asbestos has been removed, but LBP remains within the building. This LBP removal and some other aspects of the cleanup alternatives are dependent upon the specifics of the as-yet undetermined redevelopment plan, but certain general assumptions have been made to complete this evaluation. Three alternatives were previously considered for the purpose of the original ABCA, including:

- No action,
- Redevelopment using existing foundations,
- Removal of some or all of the existing foundations, followed by construction of a new structure.

These actions are addressed herein, and updated as warranted based on the additional assessment findings, City actions and cleanup actions to date.

6.1 No Action

The "no action" alternative is not considered viable because the subject property is currently in a state of disrepair and therefore has the potential to negatively impact surrounding property values. The current redevelopment climate in Knoxville and the previous assessments using funds from the EPA Brownfields Assessment and Planning Grant have generated interest in the area. The City is interested in leveraging this interest into an opportunity to advance the redevelopment of the subject site, and they have invested significant funds into replacing the roof on the building to support future redevelopment. Previous assessments have documented VOCs in breathing air which could pose a threat to human health once the site is occupied, further demonstrating that "no action" is not a viable option.

6.2 Redevelopment Using Existing Foundations

Redevelopment using existing foundations would be the preferred option if the proposed use for the subject property would support this approach. Demolition as warranted, and removal of generated demolition debris in accordance with local, State and Federal regulations would be required. One advantage of this approach would be to limit subsurface disturbance to utility trenches or other limited areas where excavation would be needed to support the redevelopment design. A SMP would be required to characterize and address potentially impacted material that may be encountered during these limited excavation activities. The SMP would be developed once preliminary plans for the site are available and the specific redevelopment activities can be anticipated.

As confirmed by the supplemental S&ME assessment activities performed in 2018, the proposed site redevelopment must address the potential for subsurface vapors to migrate to indoor ambient air thru the matrix and penetrations of the existing concrete slab. As part of the site re-design for the proposed use, a soil vapor

mitigation system would be required to protect building occupants. The goal of the soil vapor mitigation system would be to break the exposure pathway for vapor migration. Two potential approaches for the soil vapor system previously considered include an impervious barrier or a sub-slab depressurization system that creates a negative pressure gradient beneath the slab and vents the sub-slab vapors to the outdoor air. For preliminary budgeting purposes, application of a commercially available surface-applied impervious barrier product such as Retro-Coat™ had been quoted in 2015 at a cost of up to $7/square-foot for application, excluding engineering, design and monitoring costs. For an approximately 15,000 square-foot structure (size referenced in the TDEC files, but not verified for this document), this would have required $105,000 to apply the impervious barrier. The challenge with this approach given the uncertainty of the building reuse would be the need to protect the integrity of the barrier while planning for redevelopment. Utility trenching and reconfiguration of the interior portion of the basement would both have the potential to damage the barrier and render the system ineffective.

The 2015 ABCA also considered a sub-slab depressurization system for mitigation purposes. The Clean Vapor and Radon 1 mitigation designs incorporate this approach, and a copy of their plan designs completed in July 2018 and November 2018, respectively, are included in Appendix V. In order to prepare their designs, both vendors evaluated the sub-slab connectivity (i.e., permeability) of the sub-base aggregate/soil and other interstices present beneath the slab. Information regarding this connectivity was used by each vendor to determine the number and positioning of vents and fans, and other specifications for the VIMS.

The estimated fee for the installation of the Clean Vapor VIMS is $127,300 (Appendix VI). The Radon 1 estimated fee is $79,200 (Appendix VI). This does not include S&ME observations during installation or post-installation documentation by S&ME. Since two estimates were obtained, S&ME worked closely with TDEC and the City to evaluate the cleanup options. Based on the discussions with TDEC, S&ME and the City have agreed that the Radon 1 system will be used for the Sanitary Laundry site.

Since cleanup funds are limited, and because the building is currently un-occupied and therefore more prone to vandalism and/or theft, S&ME contacted both vendors to discuss partial installation of their systems, eliminating the above-ground equipment until redevelopment plans have been finalized and building improvements are underway. Clean Vapor proposed a fee of $60,600 (Appendix VI) to cover 50% of the mobilization/demobilization, soil point and soil excavation, core cutting and installation of risers, piping and balancing valves, and overhead piping within the building. Radon 1 proposed a fee of $36,000 to install 12 sub-slab pits (15-20 gallon aggregate-filled pit beneath the slab). As part of this remedial approach, S&ME would also include disposal of soil generated during installation of the sub-slab pits at an approved facility in accordance with regulatory requirements. The lower cost of the Radon 1 system and the positive TDEC experiences with this vendor were both factors in the final vendor selection.

Partial installation of the depressurization system infrastructure would lessen the burden on the next property owner, but it would also commit the building owner to complete installation of the electrical and mechanical system components required to an activate the sub-slab depressurization system, potentially limiting their option to consider alternative remedial approaches. The future building owner will need to evaluate the system relative to the proposed building renovations, and determine if additional remedial efforts would be warranted, beyond activation of the partially installed sub-slab depressurization system infrastructure.

Two non-mitigation related clean up options that could be considered to spend the remaining cleanup grant funds would be removal and disposal of the black granular material discussed at the end of Section 3.0, and/or partial removal of the LBP. S&ME has not requested a specific quote for LBP removal, but both contractors who provided estimates for ACM removal indicated the LBP abatement would be a six-figure effort. Removal of the black granular material could be accomplished for approximately $6,000, as presented in the Environmental Remediation Consultants Inc. quote located in Appendix VI.

In addition to the SMP and vapor mitigation system design, this cleanup alternative also warrants a land-use restriction to document the VIMS details, establish that groundwater usage from the subject site is prohibited, and to document the established protocol for monitoring and maintenance of the VIMS.

6.3 Removal of Some or All of the Existing Foundations

Removal of some or all of the existing foundations, followed by construction of a new structure, was considered in the 2015 ABCA. Assuming that some impacted soils and/or groundwater could potentially remain beneath the building following the removal of existing foundations, this cleanup alternative would require the same measures presented in Section 6.2, including development of a SMP, a VIMS, and filing of a land-use restriction document for the site. In addition, this alternative would require that the excavated foundations and impacted sub-slab materials be characterized and handled in accordance with local, State and Federal regulations, and in accordance with the SMP. The estimated cost for this approach was not provided in 2015, as it depends on factors such as the extent of foundation demolition proposed, the width and depth of existing foundations, and the level of impacts encountered in the underlying soils. For comparison purposes, the 2015 ABCA stated that if the underlying material is classified as special waste that can be disposed at a Subtitle D Landfill, fees for excavation, transportation and disposal might be on the order of $75/ton. If some or all of this material is classified as hazardous waste, excavation, transportation and disposal fees could increase to approximately $350/ton.

Redevelopment under this scenario would likely incur additional site characterization and regulatory negotiation fees, as it would be in the developer's best interest to obtain a thorough understanding of the existing foundation and soil conditions in the vicinity of the proposed excavation areas to the extent practicable before excavation is initiated. Because the City has completed the replacement of the roof on the building, and because there is an interest in maintaining as much of the character of the original structure as practicable, this option is likely not a priority for redevelopment considerations at this time.

7.0 Changing Climate Concerns

EPA requires that the ABCA include an evaluation of the resilience of the remedial option in light of reasonably foreseeable changing climate conditions. This includes a discussion of the observed and forecasted climate change conditions for Knoxville and the associated site-specific risk factors. In order to evaluate changing climate concerns, S&ME researched the following websites on September 4, 2015 and August 30, 2018:

- Scenarios for Climate Assessment and Adaptation, accessed on-line at: http://scenarios.globalchange.gov/content/scenarios

- Climate Explorer, accessed on-line at: https://toolkit.climate.gov/tools/climate-explorer

Due to the location of the site and the surrounding area, rising sea levels, changes in flood zones, increased salt water intrusion or increased risk of wildfires potentially associated with climate change would not be expected to have an impact on the proposed cleanup alternatives. Projected increases or decreases in temperature or precipitation or extreme weather events would also likely not impact the future site use, as it is located in a highly urbanized area surrounded by well-established buildings, roads and paved parking lots.

Changing dates for ground thaw/freezing or higher/lower groundwater tables could potentially impact the soil vapor concentrations. Proposed vapor mitigation systems are typically designed to be protective under a worst-case scenario based on known site conditions. Since the dry cleaning operations have been out of service for over 20 years, and the former dry cleaning fluid tank was emptied and filled with concrete in the 1990's, natural attenuation of organic contaminants of concern in soil and groundwater present at this site is likely occurring, and remedial design using recently documented site conditions seems to be a prudent approach for site redevelopment, irrespective of potential future fluctuations in groundwater table or thaw/freeze cycles.

Based on the databases researched and the projected climate change impacts, S&ME does not anticipate that modification to the proposed cleanup alternatives would be warranted to address changing climate conditions.

8.0 Conclusion

Partial installation of the Radon 1 VIMS, limited to subsurface and overhead piping and disposal of the generated soils, is the selected option for the use of the cleanup funds. The black granular material will also be removed from the boiler room, and partial abatement of LBP could occur with the balance of the funds. These activities would be in addition to the cleanup activities that have already occurred, including asbestos abatement and removal of pallets of paint, antifreeze, sealants, etc., previously stockpiled in the basement. The effectiveness of the proposed cleanup activities is addressed below, and the costs of the proposed activities are summarized.

8.1 Effectiveness and Implementability

The City and TDEC DOR previously provided input on the proposed cleanup alternatives for the subject property, assuming that the site will be redeveloped for retail or commercial purposes. Prior to any redevelopment activities, S&ME previously recommended removal of asbestos and LBP within the structure in accordance with applicable regulations. As discussed in Section 5, the asbestos has been removed, but LBP remains within the building. This LBP removal and some other aspects of the cleanup alternatives are dependent upon the specifics of the as-yet undetermined redevelopment plan, but certain general assumptions have been made to evaluate the effectiveness and implementability of the proposed cleanup options.

The City recently replaced the roof on the former Sanitary Laundry property. Based on the historic significance of the site, and the investment in improving the existing structure, redevelopment using existing foundations is the preferred option for site redevelopment, rather than demolishing the existing structure and foundations. In order to support this method of site redevelopment, a vapor mitigation system is warranted to mitigate those chemical constituents identified in previous assessment activities that exceed relevant regulatory comparison criteria. Based

on the findings of the S&ME Phase II assessment activities, S&ME provided the analytical results to Clean Vapor and Radon 1, two firms specializing in the design and installation of vapor mitigation systems. Both firms performed additional diagnostics testing and provided a mitigation plan design based on their building and subsurface diagnostics. Since two estimates were obtained, S&ME worked closely with TDEC and the City to evaluate the cleanup options. Based on the discussions with TDEC, S&ME and the City have agreed that the Radon 1 system will be used for the Sanitary Laundry site. Since cleanup funds are limited, and because the building is currently un-occupied and therefore more prone to vandalism and/or theft, S&ME contacted both vendors to discuss partial installation of their systems, eliminating the above-ground equipment until redevelopment plans have been finalized and building improvements are underway. The Radon 1 system should be effective in mitigating vapor intrusion, and the sub-slab installation can be implemented even though the building is currently vacant. Partial installation of the depressurization system infrastructure would lessen the burden on the next property owner.

As part of this remedial approach, S&ME would also include disposal of soil generated during installation of the sub-slab pits at an approved facility in accordance with regulatory requirements. The proposed sub-slab system installation, the accompanying soil disposal, as well as the removal and disposal of the drums of black granular material, and partial removal of the LBP, would each provide tangible property improvements that reduce the environmental concerns at the site.

The proposed cleanup actions and associated costs are summarized below, followed by a discussion of the individual components of the proposed cleanup actions.

8.2 Brownfield Cleanup Alternatives Evaluation

Remedial Alternative	Effectiveness	Implementable?	Cost
No Action	Does Not Address Vapor Intrusion Risk	No Action	$0
Reuse Existing Foundations	Allows redevelopment using City building investments	Yes – proposed actions provide tangible property improvements that reduce the environmental concerns at the site	$46,000 in subcontract fees, plus Environmental Consultant fees and laboratory analysis. Balance of cleanup fees will be used for LBP abatement.
Foundation Removal	No – does not meet City objectives	No – does not meet City objectives	Not calculated

8.3 Proposed Cleanup Approach Costs

8.3.1 Redevelopment Using Existing Foundations

a. Vapor Mitigation System (Partial installation only since the building is vacant; future redevelopment is anticipated to be limited to commercial use.)
    i. Radon 1 proposed a fee of **$36,000** to install 12 sub-slab pits (15-20 gallon aggregate-filled pit beneath the slab).
    ii. Additional fees will be required to dispose of soil generated during the installation. We anticipate a disposal fee of approximately **$1,000**, unless the material is classified as hazardous waste.

b. Black granular material located in drums in the basement will be removed and properly disposed of; A **$6,000** disposal fee was estimated by Environmental Remediation Consultants Inc.

c. A Land Use Restriction will be prepared for the site to document the subslab vapor mitigation system installation - anticipated fee of **$2,500** or less pending TDEC and City of Knoxville review and input.

d. Any leftover cleanup funds can be used to initiate lead-based paint abatement. This balance will be determined once the S&ME and subcontractor fees have been deducted from the EPA Cleanup Fund Grant.

Based upon the results of assessment activities conducted to date, the remedial alternatives presented, and climate change scenarios evaluated, S&ME does not anticipate the need to modify the proposed cleanup alternatives to address changing climate conditions.

Disclaimer: This ABCA has been prepared in accordance with EPA and TDEC standards. The cleanup alternatives are based on our understanding of existing site conditions at the time field sampling was conducted. While efforts have been made to adequately characterize site conditions, the full extent of contamination may prove to be greater or less than what is represented herein. As a result, the actual cost of implementing cleanup options may vary. Cleanup costs are based on anticipated future use of the property; however, specific details on future use were not available at the completion of this ABCA.

Appendices

Appendix I – Figures

Figure 1: Aerial Site Vicinity Map
Figure 2: Sample Location Map

REFERENCE:
GIS BASE LAYERS WERE OBTAINED FROM GOOGLE. THIS MAP IS FOR INFORMATIONAL PURPOSES ONLY. ALL FEATURE LOCATIONS DISPLAYED ARE APPROXIMATED. THEY ARE NOT BASED ON CIVIL SURVEY INFORMATION, UNLESS STATED OTHERWISE.

Drawing Path: R:_GIS PROJECTS\2017_Projects\4143-17-016 Sanitary Laundry\FIGURE 1_SITE LOCATIONS MAP.mxd plotted by jrowe 06-20-2018

AERIAL SITE VICINITY MAP

FORMER SANITARY LAUNDRY PROPERTY
625 N. BROADWAY
KNOXVILLE, TENNESSEE

SCALE:	FIGURE NO.
1 " = 400 '	1
DATE: 6-20-18	
PROJECT NUMBER: 4143-17-016	

Drawing Path: R:_GIS PROJECTS\2017_Projects\4143-17-016 Sanitary Laundry\FIG2 SANITARY LAUNDRY .mxd plotted by jrowe 06-20-2018

SAMPLE LOCATION MAP

FORMER SANITARY LAUNDRY PROPERTY
625 N. BROADWAY
KNOXVILLE, TENNESSEE

SCALE: 1 " = 50 '

DATE: 6-20-18

PROJECT NUMBER: 4143-17-016

FIGURE NO. 2

Appendix II – Laboratory Analytical Reports

ANALYTICAL REPORT

May 01, 2018

S&ME Inc. - Knoxville

Sample Delivery Group:	L986379
Samples Received:	04/17/2018
Project Number:	4143-17-016
Description:	Sanitary Laundry

Report To: Nate Peterson / Liz Porter
1413 Topside Rd
Louisville, TN 37777

Entire Report Reviewed By:

Tom Mellette
Technical Service Representative

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by ESC is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.

BASEMENT DRUMS L986379-01 Solid

Collected by: N. Peterson
Collected date/time: 04/16/18 11:45
Received date/time: 04/17/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Total Solids by Method 2540 G-2011	WG1103340	1	04/26/18 14:11	04/26/18 14:23	JD
Wet Chemistry by Method 9012B	WG1100705	1	04/19/18 21:28	04/20/18 09:14	KK
Mercury by Method 7471A	WG1100214	1	04/19/18 08:45	04/20/18 00:10	EL
Metals (ICP) by Method 6010B	WG1100250	5	04/19/18 10:30	04/20/18 08:35	CCE
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1104180	1	04/16/18 11:45	04/27/18 16:41	LRL
Semi-Volatile Organic Compounds (GC) by Method EPH	WG1100453	1	04/19/18 16:34	04/20/18 16:58	MTJ
Pesticides (GC) by Method 8081	WG1103185	1	04/26/18 09:50	04/26/18 19:03	JNS
Pesticides (GC) by Method 8081	WG1103185	1	04/26/18 09:50	04/27/18 11:52	JNS
Polychlorinated Biphenyls (GC) by Method 8082	WG1103185	1	04/26/18 09:50	04/27/18 09:57	TD
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG1100531	1	04/23/18 07:48	04/25/18 19:58	CJR

BASEMENT DRUMS L986379-02 Waste

Collected by: N. Peterson
Collected date/time: 04/16/18 11:45
Received date/time: 04/17/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Preparation by Method 1311	WG1100333	1	04/19/18 11:45	04/19/18 11:45	TM
Preparation by Method 1311	WG1101345	1	04/21/18 10:39	04/21/18 10:39	JWS
Mercury by Method 7470A	WG1100795	1	04/20/18 08:08	04/20/18 11:34	ABL
Metals (ICP) by Method 6010B	WG1100818	1	04/20/18 08:54	04/20/18 12:04	CCE
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1101749	1	04/22/18 23:34	04/22/18 23:34	JHH
Chlorinated Acid Herbicides (GC) by Method 8151A	WG1101802	1	04/23/18 07:53	04/24/18 13:47	TD
Pesticides (GC) by Method 8081B	WG1101318	1	04/22/18 11:10	04/26/18 12:00	JNS
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG1101300	1	04/23/18 12:48	04/26/18 17:29	LA

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All radiochemical sample results for solids are reported on a dry weight basis with the exception of tritium, carbon-14 and radon, unless wet weight was requested by the client. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Tom Mellette
Technical Service Representative

Total Solids by Method 2540 G-2011

Analyte	Result	Qualifier	Dilution	Analysis	Batch
	%			date / time	
Total Solids	93.8		1	04/26/2018 14:23	WG1103340

Wet Chemistry by Method 9012B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Cyanide	ND		0.250	1	04/20/2018 09:14	WG1100705

Mercury by Method 7471A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Mercury	0.167		0.0200	1	04/20/2018 00:10	WG1100214

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Aluminum	23300		50.0	5	04/20/2018 08:35	WG1100250
Antimony	ND		10.0	5	04/20/2018 08:35	WG1100250
Arsenic	ND		10.0	5	04/20/2018 08:35	WG1100250
Barium	57.1		2.50	5	04/20/2018 08:35	WG1100250
Beryllium	3.35		1.00	5	04/20/2018 08:35	WG1100250
Cadmium	ND		2.50	5	04/20/2018 08:35	WG1100250
Calcium	6210		500	5	04/20/2018 08:35	WG1100250
Chromium	221		5.00	5	04/20/2018 08:35	WG1100250
Cobalt	6.11		5.00	5	04/20/2018 08:35	WG1100250
Copper	98.5		10.0	5	04/20/2018 08:35	WG1100250
Iron	92700		50.0	5	04/20/2018 08:35	WG1100250
Lead	94.6		2.50	5	04/20/2018 08:35	WG1100250
Magnesium	11400		500	5	04/20/2018 08:35	WG1100250
Manganese	155		5.00	5	04/20/2018 08:35	WG1100250
Nickel	28.9		10.0	5	04/20/2018 08:35	WG1100250
Potassium	27100		500	5	04/20/2018 08:35	WG1100250
Selenium	ND		10.0	5	04/20/2018 08:35	WG1100250
Silver	ND		5.00	5	04/20/2018 08:35	WG1100250
Sodium	1750		500	5	04/20/2018 08:35	WG1100250
Thallium	ND		10.0	5	04/20/2018 08:35	WG1100250
Vanadium	44.6		10.0	5	04/20/2018 08:35	WG1100250
Zinc	615		25.0	5	04/20/2018 08:35	WG1100250

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Acetone	ND	J3	0.0500	1	04/27/2018 16:41	WG1104180
Benzene	ND		0.00100	1	04/27/2018 16:41	WG1104180
Bromochloromethane	ND		0.00100	1	04/27/2018 16:41	WG1104180
Bromodichloromethane	ND		0.00100	1	04/27/2018 16:41	WG1104180
Bromoform	ND		0.00100	1	04/27/2018 16:41	WG1104180
Bromomethane	ND		0.00500	1	04/27/2018 16:41	WG1104180
Carbon disulfide	ND		0.00100	1	04/27/2018 16:41	WG1104180
Carbon tetrachloride	ND		0.00100	1	04/27/2018 16:41	WG1104180
Chlorobenzene	ND		0.00100	1	04/27/2018 16:41	WG1104180
Chlorodibromomethane	ND		0.00100	1	04/27/2018 16:41	WG1104180
Chloroethane	ND		0.00500	1	04/27/2018 16:41	WG1104180
Chloroform	ND		0.00500	1	04/27/2018 16:41	WG1104180
Chloromethane	ND		0.00250	1	04/27/2018 16:41	WG1104180

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Cyclohexane	ND		0.00100	1	04/27/2018 16:41	WG1104180
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	04/27/2018 16:41	WG1104180
1,2-Dibromoethane	ND		0.00100	1	04/27/2018 16:41	WG1104180
Dichlorodifluoromethane	ND		0.00500	1	04/27/2018 16:41	WG1104180
1,1-Dichloroethane	ND		0.00100	1	04/27/2018 16:41	WG1104180
1,2-Dichloroethane	ND		0.00100	1	04/27/2018 16:41	WG1104180
1,2-Dichlorobenzene	ND		0.00100	1	04/27/2018 16:41	WG1104180
1,3-Dichlorobenzene	ND		0.00100	1	04/27/2018 16:41	WG1104180
1,4-Dichlorobenzene	ND		0.00100	1	04/27/2018 16:41	WG1104180
1,1-Dichloroethene	ND		0.00100	1	04/27/2018 16:41	WG1104180
cis-1,2-Dichloroethene	ND		0.00100	1	04/27/2018 16:41	WG1104180
trans-1,2-Dichloroethene	ND		0.00100	1	04/27/2018 16:41	WG1104180
1,2-Dichloropropane	ND		0.00100	1	04/27/2018 16:41	WG1104180
cis-1,3-Dichloropropene	ND		0.00100	1	04/27/2018 16:41	WG1104180
trans-1,3-Dichloropropene	ND		0.00100	1	04/27/2018 16:41	WG1104180
Ethylbenzene	ND		0.00100	1	04/27/2018 16:41	WG1104180
2-Hexanone	ND		0.0100	1	04/27/2018 16:41	WG1104180
Isopropylbenzene	ND		0.0100	1	04/27/2018 16:41	WG1104180
2-Butanone (MEK)	ND		0.0100	1	04/27/2018 16:41	WG1104180
Methyl Acetate	ND	J4	0.0200	1	04/27/2018 16:41	WG1104180
Methyl Cyclohexane	ND		0.00100	1	04/27/2018 16:41	WG1104180
Methylene Chloride	ND		0.00500	1	04/27/2018 16:41	WG1104180
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	04/27/2018 16:41	WG1104180
Methyl tert-butyl ether	ND		0.00100	1	04/27/2018 16:41	WG1104180
Styrene	ND		0.00100	1	04/27/2018 16:41	WG1104180
1,1,2,2-Tetrachloroethane	ND		0.00100	1	04/27/2018 16:41	WG1104180
Tetrachloroethene	ND		0.00100	1	04/27/2018 16:41	WG1104180
Toluene	ND		0.00500	1	04/27/2018 16:41	WG1104180
1,2,3-Trichlorobenzene	ND		0.00100	1	04/27/2018 16:41	WG1104180
1,2,4-Trichlorobenzene	ND		0.00100	1	04/27/2018 16:41	WG1104180
1,1,1-Trichloroethane	ND		0.00100	1	04/27/2018 16:41	WG1104180
1,1,2-Trichloroethane	ND		0.00100	1	04/27/2018 16:41	WG1104180
Trichloroethene	ND		0.00100	1	04/27/2018 16:41	WG1104180
Trichlorofluoromethane	ND		0.00500	1	04/27/2018 16:41	WG1104180
1,1,2-Trichlorotrifluoroethane	ND		0.00100	1	04/27/2018 16:41	WG1104180
Vinyl chloride	ND		0.00100	1	04/27/2018 16:41	WG1104180
Xylenes, Total	ND		0.00300	1	04/27/2018 16:41	WG1104180
(S) Toluene-d8	*108*		*80.0-120*		*04/27/2018 16:41*	WG1104180
(S) Dibromofluoromethane	*98.8*		*74.0-131*		*04/27/2018 16:41*	WG1104180
(S) a,a,a-Trifluorotoluene	*103*		*80.0-120*		*04/27/2018 16:41*	WG1104180
(S) 4-Bromofluorobenzene	*89.3*		*64.0-132*		*04/27/2018 16:41*	WG1104180

Semi-Volatile Organic Compounds (GC) by Method EPH

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Extractable Petroleum Hydrocarbon	230		4.00	1	04/20/2018 16:58	WG1100453
(S) o-Terphenyl	*45.3*		*18.0-148*		*04/20/2018 16:58*	WG1100453

Pesticides (GC) by Method 8081

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Aldrin	ND		0.0200	1	04/26/2018 19:03	WG1103185
Alpha BHC	ND		0.0200	1	04/26/2018 19:03	WG1103185
Beta BHC	ND		0.0200	1	04/26/2018 19:03	WG1103185
Delta BHC	ND		0.0200	1	04/26/2018 19:03	WG1103185

Pesticides (GC) by Method 8081

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Gamma BHC	ND		0.0200	1	04/26/2018 19:03	WG1103185
Chlordane	ND		0.200	1	04/27/2018 11:52	WG1103185
4,4-DDD	ND		0.0200	1	04/26/2018 19:03	WG1103185
4,4-DDE	ND		0.0200	1	04/26/2018 19:03	WG1103185
4,4-DDT	ND		0.0200	1	04/26/2018 19:03	WG1103185
Dieldrin	ND		0.0200	1	04/26/2018 19:03	WG1103185
Endosulfan I	ND		0.0200	1	04/26/2018 19:03	WG1103185
Endosulfan II	ND		0.0200	1	04/26/2018 19:03	WG1103185
Endosulfan sulfate	ND		0.0200	1	04/26/2018 19:03	WG1103185
Endrin	ND		0.0200	1	04/26/2018 19:03	WG1103185
Endrin aldehyde	ND		0.0200	1	04/26/2018 19:03	WG1103185
Endrin ketone	ND		0.0200	1	04/26/2018 19:03	WG1103185
Heptachlor	ND		0.0200	1	04/26/2018 19:03	WG1103185
Heptachlor epoxide	ND		0.0200	1	04/26/2018 19:03	WG1103185
Hexachlorobenzene	ND		0.0200	1	04/26/2018 19:03	WG1103185
Methoxychlor	ND		0.0200	1	04/26/2018 19:03	WG1103185
Toxaphene	ND		0.400	1	04/26/2018 19:03	WG1103185
(S) Decachlorobiphenyl	*95.1*		*10.0-148*		*04/26/2018 19:03*	WG1103185
(S) Decachlorobiphenyl	*101*		*10.0-148*		*04/27/2018 11:52*	WG1103185
(S) Tetrachloro-m-xylene	*90.8*		*21.0-146*		*04/27/2018 11:52*	WG1103185
(S) Tetrachloro-m-xylene	*94.3*		*21.0-146*		*04/26/2018 19:03*	WG1103185

Polychlorinated Biphenyls (GC) by Method 8082

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
PCB 1016	ND		0.0170	1	04/27/2018 09:57	WG1103185
PCB 1221	ND		0.0170	1	04/27/2018 09:57	WG1103185
PCB 1232	ND		0.0170	1	04/27/2018 09:57	WG1103185
PCB 1242	ND		0.0170	1	04/27/2018 09:57	WG1103185
PCB 1248	ND		0.0170	1	04/27/2018 09:57	WG1103185
PCB 1254	ND		0.0170	1	04/27/2018 09:57	WG1103185
PCB 1260	ND		0.0170	1	04/27/2018 09:57	WG1103185
(S) Decachlorobiphenyl	*69.4*		*10.0-148*		*04/27/2018 09:57*	WG1103185
(S) Tetrachloro-m-xylene	*86.3*		*21.0-146*		*04/27/2018 09:57*	WG1103185

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Acenaphthene	ND		0.0330	1	04/25/2018 19:58	WG1100531
Acenaphthylene	ND		0.0330	1	04/25/2018 19:58	WG1100531
Anthracene	ND		0.0330	1	04/25/2018 19:58	WG1100531
Benzo(a)anthracene	ND		0.0330	1	04/25/2018 19:58	WG1100531
Benzo(b)fluoranthene	0.0523		0.0330	1	04/25/2018 19:58	WG1100531
Benzo(k)fluoranthene	ND		0.0330	1	04/25/2018 19:58	WG1100531
Benzo(g,h,i)perylene	ND		0.0330	1	04/25/2018 19:58	WG1100531
Benzo(a)pyrene	ND		0.0330	1	04/25/2018 19:58	WG1100531
Bis(2-chlorethoxy)methane	ND	J4	0.333	1	04/25/2018 19:58	WG1100531
Bis(2-chloroethyl)ether	ND		0.333	1	04/25/2018 19:58	WG1100531
Bis(2-chloroisopropyl)ether	ND		0.333	1	04/25/2018 19:58	WG1100531
4-Bromophenyl-phenylether	ND		0.333	1	04/25/2018 19:58	WG1100531
Carbazole	ND		0.333	1	04/25/2018 19:58	WG1100531
4-Chloroaniline	ND		0.333	1	04/25/2018 19:58	WG1100531
2-Chloronaphthalene	ND		0.0330	1	04/25/2018 19:58	WG1100531
4-Chlorophenyl-phenylether	ND		0.333	1	04/25/2018 19:58	WG1100531
Chrysene	ND		0.0330	1	04/25/2018 19:58	WG1100531

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Dibenz(a,h)anthracene	ND		0.0330	1	04/25/2018 19:58	WG1100531
Dibenzofuran	ND		0.333	1	04/25/2018 19:58	WG1100531
3,3-Dichlorobenzidine	ND		0.333	1	04/25/2018 19:58	WG1100531
2,4-Dinitrotoluene	ND		0.333	1	04/25/2018 19:58	WG1100531
2,6-Dinitrotoluene	ND		0.333	1	04/25/2018 19:58	WG1100531
Fluoranthene	0.0382		0.0330	1	04/25/2018 19:58	WG1100531
Fluorene	ND		0.0330	1	04/25/2018 19:58	WG1100531
Hexachlorobenzene	ND		0.333	1	04/25/2018 19:58	WG1100531
Hexachloro-1,3-butadiene	ND		0.333	1	04/25/2018 19:58	WG1100531
Hexachlorocyclopentadiene	ND		0.333	1	04/25/2018 19:58	WG1100531
Hexachloroethane	ND		0.333	1	04/25/2018 19:58	WG1100531
Indeno(1,2,3-cd)pyrene	ND		0.0330	1	04/25/2018 19:58	WG1100531
Isophorone	ND	J4	0.333	1	04/25/2018 19:58	WG1100531
2-Methylnaphthalene	ND		0.0330	1	04/25/2018 19:58	WG1100531
Naphthalene	ND		0.0330	1	04/25/2018 19:58	WG1100531
2-Nitroaniline	ND		0.333	1	04/25/2018 19:58	WG1100531
3-Nitroaniline	ND		0.333	1	04/25/2018 19:58	WG1100531
4-Nitroaniline	ND		0.333	1	04/25/2018 19:58	WG1100531
Nitrobenzene	ND		0.333	1	04/25/2018 19:58	WG1100531
n-Nitrosodiphenylamine	ND		0.333	1	04/25/2018 19:58	WG1100531
n-Nitrosodi-n-propylamine	ND		0.333	1	04/25/2018 19:58	WG1100531
Phenanthrene	ND		0.0330	1	04/25/2018 19:58	WG1100531
Benzylbutyl phthalate	ND		0.333	1	04/25/2018 19:58	WG1100531
Bis(2-ethylhexyl)phthalate	ND		0.333	1	04/25/2018 19:58	WG1100531
Di-n-butyl phthalate	ND		0.333	1	04/25/2018 19:58	WG1100531
Diethyl phthalate	ND		0.333	1	04/25/2018 19:58	WG1100531
Dimethyl phthalate	ND		0.333	1	04/25/2018 19:58	WG1100531
Di-n-octyl phthalate	ND		0.333	1	04/25/2018 19:58	WG1100531
Pyrene	ND		0.0330	1	04/25/2018 19:58	WG1100531
1,2,4-Trichlorobenzene	ND		0.333	1	04/25/2018 19:58	WG1100531
4-Chloro-3-methylphenol	ND		0.333	1	04/25/2018 19:58	WG1100531
2-Chlorophenol	ND		0.333	1	04/25/2018 19:58	WG1100531
2-Methylphenol	ND		0.333	1	04/25/2018 19:58	WG1100531
3&4-Methyl Phenol	ND		0.333	1	04/25/2018 19:58	WG1100531
2,4-Dichlorophenol	ND		0.333	1	04/25/2018 19:58	WG1100531
2,4-Dimethylphenol	ND		0.333	1	04/25/2018 19:58	WG1100531
4,6-Dinitro-2-methylphenol	ND		0.333	1	04/25/2018 19:58	WG1100531
2,4-Dinitrophenol	ND		0.333	1	04/25/2018 19:58	WG1100531
2-Nitrophenol	ND		0.333	1	04/25/2018 19:58	WG1100531
4-Nitrophenol	ND	J4	0.333	1	04/25/2018 19:58	WG1100531
Pentachlorophenol	ND		0.333	1	04/25/2018 19:58	WG1100531
Phenol	ND		0.333	1	04/25/2018 19:58	WG1100531
2,4,5-Trichlorophenol	ND		0.333	1	04/25/2018 19:58	WG1100531
2,4,6-Trichlorophenol	ND	J4	0.333	1	04/25/2018 19:58	WG1100531
(S) Nitrobenzene-d5	*51.1*		*18.0-125*		*04/25/2018 19:58*	WG1100531
(S) 2-Fluorobiphenyl	*56.8*		*28.0-120*		*04/25/2018 19:58*	WG1100531
(S) p-Terphenyl-d14	*60.7*		*13.0-131*		*04/25/2018 19:58*	WG1100531
(S) Phenol-d5	*45.0*		*20.0-120*		*04/25/2018 19:58*	WG1100531
(S) 2-Fluorophenol	*52.9*		*20.0-120*		*04/25/2018 19:58*	WG1100531
(S) 2,4,6-Tribromophenol	*54.3*		*17.0-137*		*04/25/2018 19:58*	WG1100531

Preparation by Method 1311

Analyte	Result	Qualifier	Prep date / time	Batch
TCLP Extraction	-		4/19/2018 11:45:42 AM	WG1100333
TCLP ZHE Extraction	-		4/21/2018 10:39:43 AM	WG1101345
Fluid	1		4/19/2018 11:45:42 AM	WG1100333
Initial pH	6.88		4/19/2018 11:45:42 AM	WG1100333
Final pH	4.90		4/19/2018 11:45:42 AM	WG1100333

Mercury by Method 7470A

Analyte	Result mg/l	Qualifier	RDL mg/l	Limit mg/l	Dilution	Analysis date / time	Batch
Mercury	ND		0.0100	0.20	1	04/20/2018 11:34	WG1100795

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	RDL mg/l	Limit mg/l	Dilution	Analysis date / time	Batch
Arsenic	ND		0.100	5	1	04/20/2018 12:04	WG1100818
Barium	ND		0.100	100	1	04/20/2018 12:04	WG1100818
Cadmium	ND		0.100	1	1	04/20/2018 12:04	WG1100818
Chromium	ND		0.100	5	1	04/20/2018 12:04	WG1100818
Lead	ND		0.100	5	1	04/20/2018 12:04	WG1100818
Selenium	ND		0.100	1	1	04/20/2018 12:04	WG1100818
Silver	ND		0.100	5	1	04/20/2018 12:04	WG1100818

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Limit mg/l	Dilution	Analysis date / time	Batch
Benzene	ND		0.0500	0.50	1	04/22/2018 23:34	WG1101749
Carbon tetrachloride	ND		0.0500	0.50	1	04/22/2018 23:34	WG1101749
Chlorobenzene	ND		0.0500	100	1	04/22/2018 23:34	WG1101749
Chloroform	ND		0.250	6	1	04/22/2018 23:34	WG1101749
1,2-Dichloroethane	ND		0.0500	0.50	1	04/22/2018 23:34	WG1101749
1,1-Dichloroethene	ND		0.0500	0.70	1	04/22/2018 23:34	WG1101749
2-Butanone (MEK)	ND		0.500	200	1	04/22/2018 23:34	WG1101749
Tetrachloroethene	ND		0.0500	0.70	1	04/22/2018 23:34	WG1101749
Trichloroethene	ND		0.0500	0.50	1	04/22/2018 23:34	WG1101749
Vinyl chloride	ND		0.0500	0.20	1	04/22/2018 23:34	WG1101749
(S) Toluene-d8	*108*		*80.0-120*	*120*		*04/22/2018 23:34*	WG1101749
(S) Dibromofluoromethane	*101*		*76.0-123*	*123*		*04/22/2018 23:34*	WG1101749
(S) a,a,a-Trifluorotoluene	*97.7*		*80.0-120*	*120*		*04/22/2018 23:34*	WG1101749
(S) 4-Bromofluorobenzene	*98.7*		*80.0-120*	*120*		*04/22/2018 23:34*	WG1101749

Chlorinated Acid Herbicides (GC) by Method 8151A

Analyte	Result mg/l	Qualifier	RDL mg/l	Limit mg/l	Dilution	Analysis date / time	Batch
2,4,5-TP (Silvex)	ND		0.00200	1	1	04/24/2018 13:47	WG1101802
2,4-D	ND		0.00200	10	1	04/24/2018 13:47	WG1101802
(S) 2,4-Dichlorophenyl Acetic Acid	*79.8*		*14.0-158*	*158*		*04/24/2018 13:47*	WG1101802

Pesticides (GC) by Method 8081B

Analyte	Result mg/l	Qualifier	RDL mg/l	Limit mg/l	Dilution	Analysis date / time	Batch
Chlordane	ND		0.00500	0.03	1	04/26/2018 12:00	WG1101318
Endrin	ND		0.00500	0.02	1	04/26/2018 12:00	WG1101318
Heptachlor	ND		0.00500	0.0080	1	04/26/2018 12:00	WG1101318

Pesticides (GC) by Method 8081B

Analyte	Result mg/l	Qualifier	RDL mg/l	Limit mg/l	Dilution	Analysis date / time	Batch
Lindane	ND		0.00500	0.40	1	04/26/2018 12:00	WG1101318
Methoxychlor	ND		0.00500	10	1	04/26/2018 12:00	WG1101318
Toxaphene	ND		0.0100	0.50	1	04/26/2018 12:00	WG1101318
(S) Decachlorobiphenyl	*90.7*		*10.0-144*	*144*		*04/26/2018 12:00*	WG1101318
(S) Tetrachloro-m-xylene	*80.7*		*10.0-135*	*135*		*04/26/2018 12:00*	WG1101318

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

Analyte	Result mg/l	Qualifier	RDL mg/l	Limit mg/l	Dilution	Analysis date / time	Batch
1,4-Dichlorobenzene	ND	J4	0.100	7.50	1	04/26/2018 17:29	WG1101300
2,4-Dinitrotoluene	ND		0.100	0.13	1	04/26/2018 17:29	WG1101300
Hexachlorobenzene	ND		0.100	0.13	1	04/26/2018 17:29	WG1101300
Hexachloro-1,3-butadiene	ND	J4	0.100	0.50	1	04/26/2018 17:29	WG1101300
Hexachloroethane	ND	J4	0.100	3	1	04/26/2018 17:29	WG1101300
Nitrobenzene	ND	J4	0.100	2	1	04/26/2018 17:29	WG1101300
Pyridine	ND		0.100	5	1	04/26/2018 17:29	WG1101300
3&4-Methyl Phenol	ND		0.100	400	1	04/26/2018 17:29	WG1101300
2-Methylphenol	ND		0.100	200	1	04/26/2018 17:29	WG1101300
Pentachlorophenol	ND		0.100	100	1	04/26/2018 17:29	WG1101300
2,4,5-Trichlorophenol	ND	J4	0.100	400	1	04/26/2018 17:29	WG1101300
2,4,6-Trichlorophenol	ND	J4	0.100	2	1	04/26/2018 17:29	WG1101300
(S) 2-Fluorophenol	*23.4*		*10.0-120*	*120*		*04/26/2018 17:29*	WG1101300
(S) Phenol-d5	*13.5*		*10.0-120*	*120*		*04/26/2018 17:29*	WG1101300
(S) Nitrobenzene-d5	*46.6*		*10.0-126*	*126*		*04/26/2018 17:29*	WG1101300
(S) 2-Fluorobiphenyl	*53.8*		*22.0-127*	*127*		*04/26/2018 17:29*	WG1101300
(S) 2,4,6-Tribromophenol	*69.9*		*10.0-153*	*153*		*04/26/2018 17:29*	WG1101300
(S) p-Terphenyl-d14	*68.3*		*29.0-141*	*141*		*04/26/2018 17:29*	WG1101300

Method Blank (MB)

(MB) R3305193-1 04/26/18 14:23

Analyte	MB Result %	MB Qualifier	MB MDL %	MB RDL %
Total Solids	0.00100			

L988231-01 Original Sample (OS) • Duplicate (DUP)

(OS) L988231-01 04/26/18 14:23 • (DUP) R3305193-3 04/26/18 14:23

Analyte	Original Result %	DUP Result %	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Total Solids	88.3	85.5	1	3.24		5

Laboratory Control Sample (LCS)

(LCS) R3305193-2 04/26/18 14:23

Analyte	Spike Amount %	LCS Result %	LCS Rec. %	Rec. Limits %	LCS Qualifier
Total Solids	50.0	50.0	100	85.0-115	

Method Blank (MB)

(MB) R3303373-1 04/20/18 08:53

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Cyanide	U		0.0390	0.250

L986298-09 Original Sample (OS) • Duplicate (DUP)

(OS) L986298-09 04/20/18 09:11 • (DUP) R3303373-5 04/20/18 09:12

Analyte	Original Result (dry) mg/kg	DUP Result (dry) mg/kg	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Cyanide	U	0.000	1	0.000		20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3303373-2 04/20/18 08:54 • (LCSD) R3303373-3 04/20/18 08:55

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Cyanide	2.50	2.13	2.42	85.3	96.7	50.0-150			12.5	20

L986379-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L986379-01 04/20/18 09:14 • (MS) R3303373-6 04/20/18 09:18 • (MSD) R3303373-7 04/20/18 09:19

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Cyanide	1.67	ND	1.58	1.61	94.7	96.6	1	75.0-125			2.00	20

Method Blank (MB)

(MB) R3303506-1 04/20/18 11:20

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Mercury	U		0.00333	0.0100

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3303506-2 04/20/18 11:22 • (LCSD) R3303506-3 04/20/18 11:25

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Mercury	0.0300	0.0315	0.0314	105	105	80.0-120			0.404	20

L986447-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L986447-02 04/20/18 11:27 • (MS) R3303506-4 04/20/18 11:29 • (MSD) R3303506-5 04/20/18 11:31

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Mercury	0.0300	ND	0.0319	0.0297	106	99.0	1	75.0-125			7.06	20

Method Blank (MB)

(MB) R3303316-1 04/19/18 22:08

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Mercury	U		0.00280	0.0200

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3303316-2 04/19/18 22:10 • (LCSD) R3303316-3 04/19/18 22:13

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Mercury	0.300	0.271	0.279	90.2	92.9	80.0-120			2.89	20

L985884-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L985884-02 04/19/18 22:15 • (MS) R3303316-4 04/19/18 22:18 • (MSD) R3303316-5 04/19/18 22:20

Analyte	Spike Amount (dry) mg/kg	Original Result (dry) mg/kg	MS Result (dry) mg/kg	MSD Result (dry) mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Mercury	0.403	ND	0.412	0.418	98.8	100	1	75.0-125			1.35	20

Method Blank (MB)

(MB) R3303324-1 04/19/18 21:59

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Aluminum	U		3.50	10.0
Antimony	U		0.750	2.00
Arsenic	U		0.650	2.00
Barium	U		0.170	0.500
Beryllium	U		0.0700	0.200
Cadmium	U		0.0700	0.500
Calcium	U		4.63	100
Chromium	U		0.140	1.00
Cobalt	U		0.230	1.00
Copper	0.544	J	0.530	2.00
Iron	1.82	J	1.41	10.0
Lead	U		0.190	0.500
Magnesium	U		1.11	100
Manganese	U		0.120	1.00
Nickel	U		0.490	2.00
Potassium	U		10.2	100
Selenium	U		0.740	2.00
Silver	U		0.280	1.00
Sodium	U		9.85	100
Thallium	U		0.650	2.00
Vanadium	U		0.240	2.00
Zinc	U		0.590	5.00

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3303324-2 04/19/18 22:02 • (LCSD) R3303324-3 04/19/18 22:05

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Aluminum	1000	1010	1010	101	101	80.0-120			0.142	20
Antimony	100	96.7	95.6	96.7	95.6	80.0-120			1.19	20
Arsenic	100	95.4	96.3	95.4	96.3	80.0-120			0.903	20
Barium	100	104	105	104	105	80.0-120			1.07	20
Beryllium	100	103	103	103	103	80.0-120			0.215	20
Cadmium	100	94.3	95.6	94.3	95.6	80.0-120			1.37	20
Calcium	1000	1000	1010	100	101	80.0-120			0.994	20
Chromium	100	101	102	101	102	80.0-120			0.842	20
Cobalt	100	101	102	101	102	80.0-120			0.844	20
Copper	100	104	106	104	106	80.0-120			1.37	20
Iron	1000	968	968	96.8	96.8	80.0-120			0.0472	20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3303324-2 04/19/18 22:02 • (LCSD) R3303324-3 04/19/18 22:05

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Lead	100	98.0	99.0	98.0	99.0	80.0-120			0.979	20
Magnesium	1000	980	1010	98.0	101	80.0-120			2.62	20
Manganese	100	95.3	96.5	95.3	96.5	80.0-120			1.23	20
Nickel	100	99.7	101	99.7	101	80.0-120			0.853	20
Potassium	1000	965	979	96.5	97.9	80.0-120			1.41	20
Selenium	100	98.7	100	98.7	100	80.0-120			1.27	20
Silver	20.0	18.1	18.3	90.6	91.7	80.0-120			1.24	20
Sodium	1000	1030	1040	103	104	80.0-120			1.23	20
Thallium	100	98.3	98.0	98.3	98.0	80.0-120			0.310	20
Vanadium	100	98.8	99.0	98.8	99.0	80.0-120			0.289	20
Zinc	100	98.7	103	98.7	103	80.0-120			4.68	20

L986378-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L986378-01 04/19/18 22:08 • (MS) R3303324-6 04/19/18 22:18 • (MSD) R3303324-7 04/19/18 22:22

Analyte	Spike Amount (dry) mg/kg	Original Result (dry) mg/kg	MS Result (dry) mg/kg	MSD Result (dry) mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Aluminum	1040	18400	21100	17400	261	0.000	1	75.0-125	V	V	19.3	20
Antimony	104	U	45.8	45.0	43.8	43.1	1	75.0-125	J6	J6	1.62	20
Arsenic	104	U	98.1	92.8	94.0	88.9	1	75.0-125			5.53	20
Barium	104	115	223	199	103	80.5	1	75.0-125			11.2	20
Beryllium	104	0.476	104	98.0	99.5	93.4	1	75.0-125			6.30	20
Cadmium	104	U	100	94.3	95.9	90.4	1	75.0-125			5.95	20
Calcium	1040	19900	25800	25700	570	554	1	75.0-125	V	V	0.662	20
Chromium	104	26.6	113	114	82.8	83.9	1	75.0-125			1.05	20
Cobalt	104	3.20	111	102	103	94.4	1	75.0-125			8.54	20
Copper	104	26.8	141	132	110	101	1	75.0-125			6.85	20
Iron	1040	31600	29000	28200	0.000	0.000	1	75.0-125	V	V	2.94	20
Lead	104	6.53	112	113	101	102	1	75.0-125			0.534	20
Magnesium	1040	15000	13000	13700	0.000	0.000	1	75.0-125	V	V	5.06	20
Manganese	104	449	516	495	63.8	44.0	1	75.0-125	V	V	4.09	20
Nickel	104	39.4	122	119	79.0	76.2	1	75.0-125			2.45	20
Potassium	1040	3050	3850	3750	76.1	66.8	1	75.0-125		J6	2.57	20
Selenium	104	U	103	96.3	98.4	92.3	1	75.0-125			6.38	20
Silver	20.9	U	19.0	18.1	91.2	86.7	1	75.0-125			5.11	20
Sodium	1040	278	1430	1260	111	94.3	1	75.0-125			12.7	20
Thallium	104	U	102	96.1	98.1	92.1	1	75.0-125			6.25	20
Vanadium	104	58.1	152	147	89.9	85.0	1	75.0-125			3.46	20
Zinc	104	74.7	160	156	82.0	78.3	1	75.0-125			2.45	20

Method Blank (MB)

(MB) R3303486-1 04/20/18 11:35

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Arsenic	U		0.0333	0.100
Barium	U		0.0333	0.100
Cadmium	U		0.0333	0.100
Chromium	U		0.0333	0.100
Lead	U		0.0333	0.100
Selenium	U		0.0333	0.100
Silver	U		0.0333	0.100

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3303486-2 04/20/18 11:38 • (LCSD) R3303486-3 04/20/18 11:41

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Arsenic	10.0	9.88	10.0	98.8	100	80.0-120			1.71	20
Barium	10.0	10.2	10.3	102	103	80.0-120			1.12	20
Cadmium	10.0	9.86	9.99	98.6	99.9	80.0-120			1.25	20
Chromium	10.0	10.1	10.3	101	103	80.0-120			2.18	20
Lead	10.0	10.2	10.4	102	104	80.0-120			1.33	20
Selenium	10.0	9.99	10.0	99.9	100	80.0-120			0.383	20
Silver	2.00	1.84	1.87	92.2	93.4	80.0-120			1.27	20

L986456-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L986456-02 04/20/18 11:44 • (MS) R3303486-5 04/20/18 11:51 • (MSD) R3303486-6 04/20/18 11:54

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Arsenic	10.0	ND	9.95	10.2	99.5	102	1	75.0-125			2.39	20
Barium	10.0	ND	10.0	10.2	100	102	1	75.0-125			1.79	20
Cadmium	10.0	ND	9.88	10.1	98.8	101	1	75.0-125			1.93	20
Chromium	10.0	ND	10.0	10.2	99.6	101	1	75.0-125			1.44	20
Lead	10.0	0.525	10.5	10.9	99.9	103	1	75.0-125			3.37	20
Selenium	10.0	ND	10.1	10.3	101	103	1	75.0-125			2.07	20
Silver	2.00	ND	1.84	1.86	92.1	92.9	1	75.0-125			0.859	20

Method Blank (MB)

(MB) R3303848-2 04/22/18 23:15

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Benzene	U		0.0167	0.0500
Carbon tetrachloride	U		0.0167	0.0500
Chlorobenzene	U		0.0167	0.0500
Chloroform	U		0.0833	0.250
1,2-Dichloroethane	U		0.0167	0.0500
1,1-Dichloroethene	U		0.0167	0.0500
2-Butanone (MEK)	U		0.167	0.500
Tetrachloroethene	U		0.0167	0.0500
Trichloroethene	U		0.0167	0.0500
Vinyl chloride	U		0.0167	0.0500
(S) Toluene-d8	*108*			*80.0-120*
(S) Dibromofluoromethane	*103*			*76.0-123*
(S) a,a,a-Trifluorotoluene	*98.5*			*80.0-120*
(S) 4-Bromofluorobenzene	*107*			*80.0-120*

Laboratory Control Sample (LCS)

(LCS) R3303848-1 04/22/18 19:28

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Benzene	0.0250	0.0238	95.1	69.0-123	
Carbon tetrachloride	0.0250	0.0303	121	63.0-122	
Chlorobenzene	0.0250	0.0260	104	79.0-121	
Chloroform	0.0250	0.0231	92.3	72.0-121	
1,2-Dichloroethane	0.0250	0.0264	106	67.0-126	
1,1-Dichloroethene	0.0250	0.0216	86.5	64.0-129	
2-Butanone (MEK)	0.125	0.143	115	37.0-158	
Tetrachloroethene	0.0250	0.0249	99.5	70.0-127	
Trichloroethene	0.0250	0.0242	96.9	78.0-120	
Vinyl chloride	0.0250	0.0233	93.4	64.0-133	
(S) Toluene-d8			*108*	*80.0-120*	
(S) Dibromofluoromethane			*101*	*76.0-123*	
(S) a,a,a-Trifluorotoluene			*97.4*	*80.0-120*	
(S) 4-Bromofluorobenzene			*97.5*	*80.0-120*	

L986513-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L986513-01 04/23/18 12:07 • (MS) R3303989-1 04/23/18 12:26 • (MSD) R3303989-2 04/23/18 12:45

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Benzene	1.25	0.0143	9.17	4.69	73.2	37.4	10	34.0-147		J3	64.5	20
Carbon tetrachloride	1.25	0.0267	9.17	4.68	73.2	37.2	10	41.0-138		J3 J6	64.9	20
Chlorobenzene	1.25	0.0113	9.21	4.64	73.6	37.0	10	52.0-141		J3 J6	66.1	20
Chloroform	1.25	ND	9.23	4.77	73.9	38.2	10	50.0-139		J3 J6	63.7	20
1,2-Dichloroethane	1.25	0.0970	9.51	4.69	75.3	36.8	10	47.0-141		J3 J6	67.8	20
1,1-Dichloroethene	1.25	ND	9.48	4.93	75.9	39.5	10	31.0-148		J3	63.2	20
2-Butanone (MEK)	6.25	ND	44.6	24.0	71.3	38.3	10	12.0-149		J3	60.1	24
Tetrachloroethene	1.25	0.0802	9.22	4.64	73.1	36.4	10	38.0-147		J3 J6	66.2	20
Trichloroethene	1.25	0.146	9.42	4.77	74.2	37.0	10	32.0-156		J3	65.4	20
Vinyl chloride	1.25	0.0894	11.2	5.70	88.6	44.9	10	24.0-153		J3	64.8	20
(S) Toluene-d8					*102*	*102*		*80.0-120*				
(S) Dibromofluoromethane					*98.8*	*100*		*76.0-123*				
(S) a,a,a-Trifluorotoluene					*102*	*102*		*80.0-120*				
(S) 4-Bromofluorobenzene					*93.5*	*93.8*		*80.0-120*				

Method Blank (MB)

(MB) R3305424-3 04/27/18 11:08

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Acetone	U		0.0100	0.0500
Benzene	U		0.000270	0.00100
Bromodichloromethane	U		0.000254	0.00100
Bromochloromethane	U		0.000390	0.00100
Bromoform	U		0.000424	0.00100
Bromomethane	U		0.00134	0.00500
Carbon disulfide	U		0.000221	0.00100
Carbon tetrachloride	U		0.000328	0.00100
Chlorobenzene	U		0.000212	0.00100
Chlorodibromomethane	U		0.000373	0.00100
Chloroethane	U		0.000946	0.00500
Chloroform	U		0.000229	0.00500
Chloromethane	U		0.000375	0.00250
Cyclohexane	U		0.000350	0.00100
1,2-Dibromo-3-Chloropropane	U		0.00105	0.00500
1,2-Dibromoethane	U		0.000343	0.00100
1,2-Dichlorobenzene	U		0.000305	0.00100
1,3-Dichlorobenzene	U		0.000239	0.00100
1,4-Dichlorobenzene	U		0.000226	0.00100
Dichlorodifluoromethane	U		0.000713	0.00500
1,1-Dichloroethane	U		0.000199	0.00100
1,2-Dichloroethane	U		0.000265	0.00100
1,1-Dichloroethene	U		0.000303	0.00100
cis-1,2-Dichloroethene	U		0.000235	0.00100
trans-1,2-Dichloroethene	U		0.000264	0.00100
1,2-Dichloropropane	U		0.000358	0.00100
cis-1,3-Dichloropropene	U		0.000262	0.00100
trans-1,3-Dichloropropene	U		0.000267	0.00100
Ethylbenzene	U		0.000297	0.00100
2-Hexanone	U		0.00137	0.0100
Isopropylbenzene	U		0.000243	0.0100
2-Butanone (MEK)	U		0.00468	0.0100
Methyl Acetate	U		0.00610	0.0200
Methyl Cyclohexane	U		0.000380	0.00100
Methylene Chloride	U		0.00100	0.00500
4-Methyl-2-pentanone (MIBK)	U		0.00188	0.0100
Methyl tert-butyl ether	U		0.000212	0.00100
Styrene	U		0.000234	0.00100
1,1,2,2-Tetrachloroethane	U		0.000365	0.00100
Tetrachloroethene	U		0.000276	0.00100

Method Blank (MB)

(MB) R3305424-3 04/27/18 11:08

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Toluene	U		0.000434	0.00500
1,1,2-Trichlorotrifluoroethane	U		0.000365	0.00100
1,2,3-Trichlorobenzene	U		0.000306	0.00100
1,2,4-Trichlorobenzene	U		0.000388	0.00100
1,1,1-Trichloroethane	U		0.000286	0.00100
1,1,2-Trichloroethane	U		0.000277	0.00100
Trichloroethene	U		0.000279	0.00100
Trichlorofluoromethane	U		0.000382	0.00500
Vinyl chloride	U		0.000291	0.00100
Xylenes, Total	U		0.000698	0.00300
(S) Toluene-d8	*111*			*80.0-120*
(S) Dibromofluoromethane	*96.5*			*74.0-131*
(S) a,a,a-Trifluorotoluene	*104*			*80.0-120*
(S) 4-Bromofluorobenzene	*90.1*			*64.0-132*

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3305424-1 04/27/18 10:09 • (LCSD) R3305424-2 04/27/18 10:29

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Acetone	0.125	0.0480	0.0349	38.4	27.9	11.0-160		J3	31.7	23
Benzene	0.0250	0.0241	0.0239	96.3	95.7	71.0-124			0.628	20
Bromodichloromethane	0.0250	0.0202	0.0210	81.0	83.9	75.0-120			3.56	20
Bromochloromethane	0.0250	0.0256	0.0253	102	101	80.0-121			1.04	20
Bromoform	0.0250	0.0190	0.0200	75.9	80.1	65.0-133			5.31	20
Bromomethane	0.0250	0.0266	0.0269	107	107	26.0-160			0.856	20
Carbon disulfide	0.0250	0.0205	0.0204	82.1	81.7	53.0-130			0.449	20
Carbon tetrachloride	0.0250	0.0232	0.0227	92.6	90.9	66.0-123			1.85	20
Chlorobenzene	0.0250	0.0290	0.0291	116	117	79.0-121			0.570	20
Chlorodibromomethane	0.0250	0.0238	0.0243	95.3	97.1	74.0-128			1.85	20
Chloroethane	0.0250	0.0235	0.0236	94.1	94.5	51.0-147			0.371	20
Chloroform	0.0250	0.0228	0.0224	91.2	89.5	73.0-123			1.90	20
Chloromethane	0.0250	0.0196	0.0195	78.3	78.2	51.0-138			0.132	20
Cyclohexane	0.0250	0.0220	0.0216	88.2	86.2	70.0-130			2.27	20
1,2-Dibromo-3-Chloropropane	0.0250	0.0210	0.0198	83.8	79.3	65.0-126			5.59	20
1,2-Dibromoethane	0.0250	0.0264	0.0263	105	105	78.0-122			0.370	20
1,2-Dichlorobenzene	0.0250	0.0254	0.0250	101	99.9	80.0-120			1.54	20
1,3-Dichlorobenzene	0.0250	0.0259	0.0255	104	102	72.0-123			1.43	20
1,4-Dichlorobenzene	0.0250	0.0250	0.0249	99.9	99.7	77.0-120			0.205	20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3305424-1 04/27/18 10:09 • (LCSD) R3305424-2 04/27/18 10:29

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Dichlorodifluoromethane	0.0250	0.0225	0.0227	89.8	90.8	49.0-155			1.14	20
1,1-Dichloroethane	0.0250	0.0235	0.0240	94.1	95.8	70.0-128			1.84	20
1,2-Dichloroethane	0.0250	0.0219	0.0215	87.7	86.1	69.0-128			1.81	20
1,1-Dichloroethene	0.0250	0.0226	0.0223	90.4	89.2	63.0-131			1.32	20
cis-1,2-Dichloroethene	0.0250	0.0230	0.0227	91.9	90.9	74.0-123			1.10	20
trans-1,2-Dichloroethene	0.0250	0.0229	0.0233	91.5	93.4	72.0-122			1.98	20
1,2-Dichloropropane	0.0250	0.0233	0.0233	93.2	93.0	75.0-126			0.126	20
cis-1,3-Dichloropropene	0.0250	0.0259	0.0262	104	105	80.0-125			1.13	20
trans-1,3-Dichloropropene	0.0250	0.0253	0.0254	101	102	75.0-129			0.384	20
Ethylbenzene	0.0250	0.0272	0.0268	109	107	77.0-120			1.60	20
2-Hexanone	0.125	0.111	0.107	89.2	85.5	61.0-143			4.27	20
Isopropylbenzene	0.0250	0.0227	0.0222	90.9	88.8	75.0-120			2.31	20
2-Butanone (MEK)	0.125	0.0646	0.0597	51.7	47.7	37.0-159			7.91	20
Methyl Acetate	0.125	0.0830	0.0782	66.4	62.5	70.0-130	J4	J4	5.94	21.3
Methyl Cyclohexane	0.0250	0.0213	0.0212	85.2	84.9	70.0-130			0.252	21.3
Methylene Chloride	0.0250	0.0231	0.0225	92.6	90.1	67.0-123			2.75	20
4-Methyl-2-pentanone (MIBK)	0.125	0.0991	0.0967	79.3	77.4	60.0-144			2.42	20
Methyl tert-butyl ether	0.0250	0.0225	0.0210	89.9	84.0	66.0-125			6.73	20
Styrene	0.0250	0.0216	0.0227	86.5	90.7	78.0-124			4.75	20
1,1,2,2-Tetrachloroethane	0.0250	0.0198	0.0202	79.0	81.0	73.0-120			2.41	20
Tetrachloroethene	0.0250	0.0290	0.0289	116	116	70.0-127			0.275	20
Toluene	0.0250	0.0265	0.0267	106	107	77.0-120			0.524	20
1,1,2-Trichlorotrifluoroethane	0.0250	0.0253	0.0251	101	101	64.0-135			0.723	20
1,2,3-Trichlorobenzene	0.0250	0.0286	0.0239	114	95.5	68.0-126			17.9	20
1,2,4-Trichlorobenzene	0.0250	0.0287	0.0247	115	98.7	70.0-127			15.1	20
1,1,1-Trichloroethane	0.0250	0.0212	0.0212	84.6	84.7	69.0-125			0.118	20
1,1,2-Trichloroethane	0.0250	0.0259	0.0255	103	102	78.0-120			1.37	20
Trichloroethene	0.0250	0.0270	0.0274	108	110	79.0-120			1.63	20
Trichlorofluoromethane	0.0250	0.0267	0.0264	107	106	59.0-136			0.834	20
Vinyl chloride	0.0250	0.0237	0.0234	94.7	93.7	63.0-134			1.11	20
Xylenes, Total	0.0750	0.0817	0.0808	109	108	77.0-120			1.11	20
(S) Toluene-d8				*113*	*112*	*80.0-120*				
(S) Dibromofluoromethane				*96.2*	*94.0*	*74.0-131*				
(S) a,a,a-Trifluorotoluene				*103*	*103*	*80.0-120*				
(S) 4-Bromofluorobenzene				*87.9*	*89.5*	*64.0-132*				

Method Blank (MB)

(MB) R3303604-1 04/20/18 15:01

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Extractable Petroleum Hydrocarbon	U		1.05	4.00
(S) o-Terphenyl	*116*			*18.0-148*

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3303604-2 04/20/18 15:14 • (LCSD) R3303604-3 04/20/18 15:26

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Extractable Petroleum Hydrocarbon	50.0	31.3	32.7	62.6	65.3	50.0-150			4.23	20
(S) o-Terphenyl				*91.0*	*92.0*	*18.0-148*				

Method Blank (MB)

(MB) R3304266-1 04/24/18 11:08

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
2,4-D	U		0.000667	0.00200
2,4,5-TP (Silvex)	U		0.000667	0.00200
(S) 2,4-Dichlorophenyl Acetic Acid	*82.9*			*14.0-158*

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3304266-2 04/24/18 11:34 • (LCSD) R3304266-3 04/24/18 11:47

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
2,4-D	0.00500	0.00454	0.00422	90.7	84.5	56.0-120			7.10	20
2,4,5-TP (Silvex)	0.00500	0.00513	0.00516	103	103	55.0-120			0.625	20
(S) 2,4-Dichlorophenyl Acetic Acid				*91.4*	*89.1*	*14.0-158*				

Method Blank (MB)

(MB) R3305205-1 04/26/18 18:26

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Aldrin	U		0.00135	0.0200
Alpha BHC	U		0.00136	0.0200
Beta BHC	U		0.00160	0.0200
Delta BHC	U		0.00143	0.0200
Gamma BHC	U		0.00145	0.0200
4,4-DDD	U		0.00156	0.0200
4,4-DDE	U		0.00154	0.0200
4,4-DDT	U		0.00200	0.0200
Dieldrin	U		0.00152	0.0200
Endosulfan I	U		0.00149	0.0200
Endosulfan II	U		0.00160	0.0200
Endosulfan sulfate	U		0.00151	0.0200
Endrin	U		0.00157	0.0200
Endrin aldehyde	U		0.00129	0.0200
Endrin ketone	U		0.00165	0.0200
Heptachlor	U		0.00154	0.0200
Heptachlor epoxide	U		0.00161	0.0200
Hexachlorobenzene	U		0.00124	0.0200
Methoxychlor	U		0.00178	0.0200
Chlordane	U		0.0390	0.200
Toxaphene	U		0.0360	0.400
(S) Decachlorobiphenyl	*82.5*			*10.0-148*
(S) Tetrachloro-m-xylene	*84.8*			*21.0-146*

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3305205-2 04/26/18 18:38 • (LCSD) R3305205-3 04/26/18 18:51

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Aldrin	0.0667	0.0573	0.0447	85.9	67.1	55.0-137			24.6	29
Alpha BHC	0.0667	0.0595	0.0455	89.2	68.2	55.0-136			26.7	28
Beta BHC	0.0667	0.0596	0.0453	89.3	67.9	53.0-133			27.2	28
Delta BHC	0.0667	0.0573	0.0440	85.9	65.9	53.0-139			26.3	29
Gamma BHC	0.0667	0.0573	0.0441	85.9	66.1	54.0-136			26.1	29
4,4-DDD	0.0667	0.0606	0.0471	90.8	70.6	51.0-141			25.1	29
4,4-DDE	0.0667	0.0580	0.0457	87.0	68.5	53.0-142			23.8	30
4,4-DDT	0.0667	0.0590	0.0468	88.5	70.1	47.0-143			23.2	30
Dieldrin	0.0667	0.0576	0.0452	86.3	67.8	54.0-141			24.0	29
Endosulfan I	0.0667	0.0598	0.0467	89.6	70.0	54.0-141			24.6	29

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3305205-2 04/26/18 18:38 • (LCSD) R3305205-3 04/26/18 18:51

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Endosulfan II	0.0667	0.0599	0.0465	89.7	69.7	53.0-140			25.1	28
Endosulfan sulfate	0.0667	0.0609	0.0475	91.3	71.2	52.0-141			24.8	29
Endrin	0.0667	0.0597	0.0475	89.6	71.2	52.0-137			22.9	29
Endrin aldehyde	0.0667	0.0588	0.0461	88.1	69.1	30.0-127			24.2	31
Endrin ketone	0.0667	0.0647	0.0500	97.0	74.9	51.0-139			25.7	28
Heptachlor	0.0667	0.0598	0.0468	89.6	70.2	53.0-144			24.2	29
Heptachlor epoxide	0.0667	0.0598	0.0468	89.6	70.1	54.0-137			24.4	28
Hexachlorobenzene	0.0667	0.0588	0.0465	88.1	69.7	50.0-135			23.3	28
Methoxychlor	0.0667	0.0660	0.0516	99.0	77.3	49.0-145			24.6	29
(S) Decachlorobiphenyl				*81.0*	*67.0*	*10.0-148*				
(S) Tetrachloro-m-xylene				*81.3*	*67.7*	*21.0-146*				

L987938-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L987938-02 04/26/18 19:28 • (MS) R3305205-4 04/26/18 19:40 • (MSD) R3305205-5 04/26/18 19:53

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Aldrin	0.0667	ND	0.0454	0.0387	68.0	58.1	1	19.0-152			15.7	24
Alpha BHC	0.0667	ND	0.0680	0.0561	102	84.1	1	39.0-152			19.3	21
Beta BHC	0.0667	ND	0.0681	0.0548	102	82.2	1	38.0-150		J3	21.6	20
Delta BHC	0.0667	ND	0.0660	0.0526	98.9	78.9	1	34.0-155		J3	22.6	21
Gamma BHC	0.0667	ND	0.0669	0.0542	100	81.3	1	38.0-153			21.0	21
4,4-DDD	0.0667	ND	0.0524	0.0425	78.5	63.7	1	22.0-160			20.8	25
4,4-DDE	0.0667	ND	0.0446	0.0370	66.9	55.5	1	10.0-160			18.6	27
4,4-DDT	0.0667	ND	0.0455	0.0359	68.2	53.9	1	10.0-160			23.5	28
Dieldrin	0.0667	ND	0.0550	0.0440	82.4	65.9	1	30.0-158			22.3	25
Endosulfan I	0.0667	ND	0.0587	0.0470	88.0	70.5	1	31.0-155			22.2	25
Endosulfan II	0.0667	ND	0.0623	0.0491	93.4	73.6	1	32.0-156			23.8	25
Endosulfan sulfate	0.0667	ND	0.0674	0.0513	101	76.9	1	31.0-158		J3	27.2	24
Endrin	0.0667	ND	0.0584	0.0455	87.5	68.2	1	30.0-149			24.8	25
Endrin aldehyde	0.0667	ND	0.0654	0.0504	98.0	75.6	1	20.0-157			25.8	26
Endrin ketone	0.0667	ND	0.0722	0.0561	108	84.1	1	32.0-154		J3	25.1	23
Heptachlor	0.0667	ND	0.0513	0.0429	76.8	64.3	1	18.0-160			17.7	23
Heptachlor epoxide	0.0667	ND	0.0584	0.0470	87.5	70.4	1	31.0-154			21.6	25
Hexachlorobenzene	0.0667	ND	0.0545	0.0481	81.7	72.1	1	26.0-146			12.5	21
Methoxychlor	0.0667	ND	0.0531	0.0414	79.6	62.0	1	10.0-160			24.8	27
(S) Decachlorobiphenyl					*56.9*	*53.9*		*10.0-148*				
(S) Tetrachloro-m-xylene					*72.1*	*67.8*		*21.0-146*				

Method Blank (MB)

(MB) R3304579-1 04/24/18 23:49

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Gamma BHC	U		0.00167	0.00500
Endrin	U		0.00167	0.00500
Heptachlor	U		0.00167	0.00500
Methoxychlor	U		0.00167	0.00500
Chlordane	U		0.00167	0.00500
Toxaphene	U		0.00333	0.0100
(S) Decachlorobiphenyl	*87.9*			*10.0-144*
(S) Tetrachloro-m-xylene	*71.8*			*10.0-135*

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3304579-2 04/25/18 00:04 • (LCSD) R3304579-3 04/25/18 00:19

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Gamma BHC	0.00100	0.000934	0.00103	93.4	103	56.0-133			10.3	20
Endrin	0.00100	0.00112	0.00123	112	123	58.0-135			9.25	20
Heptachlor	0.00100	0.000819	0.000928	81.9	92.8	37.0-134			12.5	24
Methoxychlor	0.00100	0.00117	0.00128	117	128	44.0-160			9.36	22
(S) Decachlorobiphenyl				*70.8*	*89.4*	*10.0-144*				
(S) Tetrachloro-m-xylene				*67.6*	*72.3*	*10.0-135*				

L986379-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L986379-02 04/26/18 12:00 • (MS) R3305087-1 04/26/18 12:13 • (MSD) R3305087-2 04/26/18 12:25

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Gamma BHC	0.0100	ND	0.00929	0.00899	92.9	89.9	1	56.0-133			3.26	20
Endrin	0.0100	ND	0.0104	0.00988	104	98.8	1	58.0-135			5.11	20
Heptachlor	0.0100	ND	0.00825	0.00741	82.5	74.1	1	37.0-134			10.7	24
Methoxychlor	0.0100	ND	0.0122	0.0111	122	111	1	44.0-160			9.14	22
(S) Decachlorobiphenyl					*90.2*	*93.7*		*10.0-144*				
(S) Tetrachloro-m-xylene					*77.2*	*74.8*		*10.0-135*				

Method Blank (MB)

(MB) R3305386-1 04/27/18 09:13

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
PCB 1016	U		0.00350	0.0170
PCB 1221	U		0.00537	0.0170
PCB 1232	U		0.00417	0.0170
PCB 1242	U		0.00318	0.0170
PCB 1248	U		0.00315	0.0170
PCB 1254	U		0.00472	0.0170
PCB 1260	U		0.00494	0.0170
(S) Decachlorobiphenyl	*75.8*			*10.0-148*
(S) Tetrachloro-m-xylene	*74.9*			*21.0-146*

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3305386-2 04/27/18 09:28 • (LCSD) R3305386-3 04/27/18 09:42

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
PCB 1260	0.167	0.163	0.150	97.8	89.7	37.0-145			19.8	37
PCB 1016	0.167	0.143	0.129	85.9	77.4	36.0-141			2.43	35
(S) Decachlorobiphenyl				*77.6*	*68.4*	*10.0-148*				
(S) Tetrachloro-m-xylene				*77.9*	*71.0*	*21.0-146*				

L987938-13 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L987938-13 04/27/18 13:04 • (MS) R3305386-4 04/27/18 13:18 • (MSD) R3305386-5 04/27/18 13:33

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
PCB 1260	0.167	ND	0.111	0.126	27.0	35.8	1	10.0-160			12.4	31
PCB 1016	0.167	ND	0.0875	0.103	35.7	45.0	1	17.0-160			16.2	30
(S) Decachlorobiphenyl					*36.5*	*43.9*		*10.0-148*				
(S) Tetrachloro-m-xylene					*54.9*	*71.8*		*21.0-146*				

Method Blank (MB)

(MB) R3304527-3 04/25/18 10:24

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Acenaphthene	U		0.00642	0.0330
Acenaphthylene	U		0.00671	0.0330
Anthracene	U		0.00632	0.0330
Benzo(a)anthracene	U		0.00428	0.0330
Benzo(b)fluoranthene	U		0.00695	0.0330
Benzo(k)fluoranthene	U		0.00582	0.0330
Benzo(g,h,i)perylene	U		0.00721	0.0330
Benzo(a)pyrene	U		0.00548	0.0330
Bis(2-chlorethoxy)methane	U		0.00770	0.333
Bis(2-chloroethyl)ether	U		0.00896	0.333
Bis(2-chloroisopropyl)ether	U		0.00760	0.333
4-Bromophenyl-phenylether	U		0.0114	0.333
Carbazole	U		0.00524	0.333
4-Chloroaniline	U		0.0352	0.333
2-Chloronaphthalene	U		0.00639	0.0330
4-Chlorophenyl-phenylether	U		0.00627	0.333
Chrysene	U		0.00555	0.0330
Dibenz(a,h)anthracene	U		0.00821	0.0330
Dibenzofuran	U		0.00518	0.333
3,3-Dichlorobenzidine	U		0.0794	0.333
2,4-Dinitrotoluene	U		0.00607	0.333
2,6-Dinitrotoluene	U		0.00737	0.333
Fluoranthene	U		0.00496	0.0330
Fluorene	U		0.00682	0.0330
Hexachlorobenzene	U		0.00856	0.333
Hexachloro-1,3-butadiene	U		0.0100	0.333
Hexachlorocyclopentadiene	U		0.0587	0.333
Hexachloroethane	U		0.0134	0.333
Indeno(1,2,3-cd)pyrene	U		0.00772	0.0330
Isophorone	U		0.00522	0.333
2-Methylnaphthalene	U		0.00861	0.0330
Naphthalene	U		0.00889	0.0330
2-Nitroaniline	U		0.00755	0.333
3-Nitroaniline	U		0.00850	0.333
4-Nitroaniline	U		0.00639	0.333
Nitrobenzene	U		0.00695	0.333
n-Nitrosodiphenylamine	U		0.00594	0.333
n-Nitrosodi-n-propylamine	U		0.00906	0.333
Phenanthrene	U		0.00528	0.0330
Benzylbutyl phthalate	U		0.0103	0.333

Method Blank (MB)

(MB) R3304527-3 04/25/18 10:24

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Bis(2-ethylhexyl)phthalate	U		0.0120	0.333
Di-n-butyl phthalate	U		0.0109	0.333
Diethyl phthalate	U		0.00691	0.333
Dimethyl phthalate	U		0.00540	0.333
Di-n-octyl phthalate	U		0.00907	0.333
Pyrene	U		0.0123	0.0330
1,2,4-Trichlorobenzene	U		0.00876	0.333
4-Chloro-3-methylphenol	U		0.00477	0.333
2-Chlorophenol	U		0.00831	0.333
2-Methylphenol	U		0.00986	0.333
3&4-Methyl Phenol	U		0.00783	0.333
2,4-Dichlorophenol	U		0.00746	0.333
2,4-Dimethylphenol	U		0.0471	0.333
4,6-Dinitro-2-methylphenol	U		0.124	0.333
2,4-Dinitrophenol	U		0.0980	0.333
2-Nitrophenol	U		0.0130	0.333
4-Nitrophenol	U		0.0525	0.333
Pentachlorophenol	U		0.0480	0.333
Phenol	U		0.00695	0.333
2,4,5-Trichlorophenol	U		0.0104	0.333
2,4,6-Trichlorophenol	U		0.00779	0.333
(S) Nitrobenzene-d5	*47.2*			*18.0-125*
(S) 2-Fluorobiphenyl	*51.1*			*28.0-120*
(S) p-Terphenyl-d14	*56.4*			*13.0-131*
(S) Phenol-d5	*44.1*			*20.0-120*
(S) 2-Fluorophenol	*54.0*			*20.0-120*
(S) 2,4,6-Tribromophenol	*54.4*			*17.0-137*

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3304527-1 04/25/18 09:37 • (LCSD) R3304527-2 04/25/18 10:01

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Acenaphthene	0.667	0.351	0.369	52.6	55.4	47.0-120			5.19	21
Acenaphthylene	0.667	0.353	0.373	53.0	55.8	48.0-120			5.32	21
Anthracene	0.667	0.339	0.358	50.8	53.6	46.0-120			5.52	20
Benzo(a)anthracene	0.667	0.360	0.385	54.0	57.8	46.0-120			6.79	20
Benzo(b)fluoranthene	0.667	0.370	0.377	55.4	56.5	45.0-120			1.89	22
Benzo(k)fluoranthene	0.667	0.373	0.409	55.9	61.4	45.0-120			9.32	23

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3304527-1 04/25/18 09:37 • (LCSD) R3304527-2 04/25/18 10:01

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Benzo(g,h,i)perylene	0.667	0.382	0.410	57.2	61.5	48.0-120			7.26	21
Benzo(a)pyrene	0.667	0.371	0.393	55.7	58.9	46.0-120			5.67	21
Bis(2-chlorethoxy)methane	0.667	0.262	0.262	39.2	39.3	41.0-120	J4	J4	0.327	22
Bis(2-chloroethyl)ether	0.667	0.293	0.289	43.9	43.3	28.0-120			1.52	28
Bis(2-chloroisopropyl)ether	0.667	0.307	0.327	46.0	49.0	40.0-120			6.28	27
4-Bromophenyl-phenylether	0.667	0.391	0.420	58.6	63.0	45.0-120			7.28	20
Carbazole	0.667	0.361	0.377	54.1	56.6	41.0-120			4.46	20
4-Chloroaniline	0.667	0.243	0.239	36.4	35.9	27.0-120			1.31	25
2-Chloronaphthalene	0.667	0.341	0.365	51.1	54.7	43.0-120			6.80	22
4-Chlorophenyl-phenylether	0.667	0.369	0.393	55.3	58.9	46.0-120			6.33	21
Chrysene	0.667	0.363	0.380	54.4	56.9	46.0-120			4.59	20
Dibenz(a,h)anthracene	0.667	0.387	0.415	57.9	62.3	47.0-120			7.20	22
Dibenzofuran	0.667	0.349	0.372	52.4	55.8	43.0-120			6.29	21
3,3-Dichlorobenzidine	0.667	0.353	0.372	52.9	55.8	20.0-130			5.40	24
2,4-Dinitrotoluene	0.667	0.364	0.385	54.5	57.8	48.0-122			5.84	21
2,6-Dinitrotoluene	0.667	0.347	0.362	52.0	54.2	46.0-120			4.30	21
Fluoranthene	0.667	0.371	0.394	55.6	59.1	46.0-120			6.04	20
Fluorene	0.667	0.367	0.384	55.1	57.6	47.0-120			4.45	20
Hexachlorobenzene	0.667	0.403	0.442	60.4	66.2	42.0-120			9.17	20
Hexachloro-1,3-butadiene	0.667	0.333	0.361	49.9	54.2	36.0-120			8.19	26
Hexachlorocyclopentadiene	0.667	0.288	0.288	43.1	43.2	20.0-124			0.209	26
Hexachloroethane	0.667	0.297	0.312	44.6	46.8	32.0-120			4.93	31
Indeno(1,2,3-cd)pyrene	0.667	0.392	0.420	58.7	62.9	48.0-120			6.90	21
Isophorone	0.667	0.272	0.272	40.8	40.8	42.0-120	J4	J4	0.0117	21
2-Methylnaphthalene	0.667	0.293	0.305	44.0	45.7	43.0-120			3.86	22
Naphthalene	0.667	0.289	0.301	43.3	45.1	41.0-120			4.11	24
2-Nitroaniline	0.667	0.358	0.384	53.7	57.6	46.0-125			6.97	21
3-Nitroaniline	0.667	0.328	0.338	49.2	50.7	37.0-120			3.06	22
4-Nitroaniline	0.667	0.405	0.424	60.8	63.6	31.0-127			4.52	26
Nitrobenzene	0.667	0.280	0.283	42.0	42.4	36.0-120			0.979	24
n-Nitrosodiphenylamine	0.667	0.342	0.362	51.3	54.3	42.0-120			5.73	20
n-Nitrosodi-n-propylamine	0.667	0.309	0.313	46.4	47.0	39.0-120			1.31	23
Phenanthrene	0.667	0.354	0.375	53.0	56.2	45.0-120			5.90	20
Benzylbutyl phthalate	0.667	0.394	0.409	59.0	61.4	41.0-123			3.88	20
Bis(2-ethylhexyl)phthalate	0.667	0.396	0.405	59.4	60.7	41.0-124			2.21	20
Di-n-butyl phthalate	0.667	0.381	0.394	57.2	59.1	44.0-120			3.26	20
Diethyl phthalate	0.667	0.357	0.375	53.5	56.2	46.0-120			4.92	20
Dimethyl phthalate	0.667	0.354	0.373	53.1	55.9	47.0-120			5.20	21
Di-n-octyl phthalate	0.667	0.394	0.405	59.0	60.7	40.0-123			2.80	21
Pyrene	0.667	0.372	0.389	55.7	58.4	45.0-120			4.68	21

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3304527-1 04/25/18 09:37 • (LCSD) R3304527-2 04/25/18 10:01

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
1,2,4-Trichlorobenzene	0.667	0.309	0.324	46.4	48.6	40.0-120			4.71	25
4-Chloro-3-methylphenol	0.667	0.321	0.325	48.2	48.7	46.0-120			1.09	20
2-Chlorophenol	0.667	0.331	0.341	49.6	51.1	37.0-120			3.03	27
2-Methylphenol	0.667	0.319	0.326	47.9	48.9	41.0-120			2.20	24
3&4-Methyl Phenol	0.667	0.391	0.395	58.7	59.3	47.0-120			1.02	24
2,4-Dichlorophenol	0.667	0.334	0.355	50.1	53.2	45.0-120			6.03	21
2,4-Dimethylphenol	0.667	0.305	0.308	45.7	46.1	40.0-120			0.822	22
4,6-Dinitro-2-methylphenol	0.667	0.319	0.331	47.8	49.7	34.0-120			3.85	23
2,4-Dinitrophenol	0.667	0.251	0.253	37.6	37.9	10.0-120			0.662	30
2-Nitrophenol	0.667	0.327	0.340	49.0	51.0	42.0-120			4.01	24
4-Nitrophenol	0.667	0.217	0.193	32.6	29.0	40.0-120	J4	J4	11.7	21
Pentachlorophenol	0.667	0.229	0.258	34.3	38.7	33.0-122			12.0	22
Phenol	0.667	0.311	0.343	46.7	51.4	38.0-120			9.62	25
2,4,5-Trichlorophenol	0.667	0.323	0.363	48.4	54.5	44.0-120			11.9	22
2,4,6-Trichlorophenol	0.667	0.307	0.322	46.1	48.2	47.0-120	J4		4.61	22
(S) Nitrobenzene-d5				*41.3*	*43.1*	*18.0-125*				
(S) 2-Fluorobiphenyl				*50.8*	*55.0*	*28.0-120*				
(S) p-Terphenyl-d14				*57.1*	*61.2*	*13.0-131*				
(S) Phenol-d5				*44.6*	*45.9*	*20.0-120*				
(S) 2-Fluorophenol				*53.8*	*57.3*	*20.0-120*				
(S) 2,4,6-Tribromophenol				*55.9*	*63.3*	*17.0-137*				

Method Blank (MB)

(MB) R3305136-3 04/26/18 12:45

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
1,4-Dichlorobenzene	U		0.0333	0.100
2,4-Dinitrotoluene	U		0.0333	0.100
Hexachlorobenzene	U		0.0333	0.100
Hexachloro-1,3-butadiene	U		0.0333	0.100
Hexachloroethane	U		0.0333	0.100
Nitrobenzene	U		0.0333	0.100
Pyridine	U		0.0333	0.100
2-Methylphenol	U		0.0333	0.100
3&4-Methyl Phenol	U		0.0333	0.100
Pentachlorophenol	U		0.0333	0.100
2,4,5-Trichlorophenol	U		0.0333	0.100
2,4,6-Trichlorophenol	U		0.0333	0.100
(S) Nitrobenzene-d5	*36.5*			*10.0-126*
(S) 2-Fluorobiphenyl	*41.6*			*22.0-127*
(S) p-Terphenyl-d14	*71.7*			*29.0-141*
(S) Phenol-d5	*23.7*			*10.0-120*
(S) 2-Fluorophenol	*33.5*			*10.0-120*
(S) 2,4,6-Tribromophenol	*63.2*			*10.0-153*

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3305136-1 04/26/18 11:58 • (LCSD) R3305136-2 04/26/18 12:22

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
1,4-Dichlorobenzene	0.0500	0.0236	0.0104	47.2	20.7	26.0-120		J3 J4	77.9	30
2,4-Dinitrotoluene	0.0500	0.0382	0.0300	76.3	60.0	47.0-127		J3	23.9	21
Hexachlorobenzene	0.0500	0.0336	0.0265	67.3	53.0	41.0-124		J3	23.8	21
Hexachloro-1,3-butadiene	0.0500	0.0279	0.0118	55.9	23.5	26.0-120		J3 J4	81.5	31
Hexachloroethane	0.0500	0.0228	0.00974	45.7	19.5	22.0-120		J3 J4	80.4	34
Nitrobenzene	0.0500	0.0229	0.0103	45.8	20.7	31.0-120		J3 J4	75.6	28
Pyridine	0.0500	0.0258	0.0157	51.7	31.4	10.0-120		J3	48.7	39
2-Methylphenol	0.0500	0.0251	0.0137	50.1	27.5	26.0-120		J3	58.4	27
3&4-Methyl Phenol	0.0500	0.0282	0.0168	56.3	33.6	27.0-120		J3	50.5	28
Pentachlorophenol	0.0500	0.0327	0.0225	65.4	45.1	20.0-126		J3	36.7	32
2,4,5-Trichlorophenol	0.0500	0.0290	0.0200	57.9	40.0	44.0-124		J3 J4	36.5	24
2,4,6-Trichlorophenol	0.0500	0.0296	0.0178	59.2	35.5	40.0-122		J3 J4	50.0	24
(S) Nitrobenzene-d5				*49.6*	*22.5*	*10.0-126*				
(S) 2-Fluorobiphenyl				*56.7*	*27.3*	*22.0-127*				
(S) p-Terphenyl-d14				*84.0*	*64.4*	*29.0-141*				

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3305136-1 04/26/18 11:58 • (LCSD) R3305136-2 04/26/18 12:22

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
(S) Phenol-d5				*30.3*	*16.6*	*10.0-120*				
(S) 2-Fluorophenol				*42.4*	*22.6*	*10.0-120*				
(S) 2,4,6-Tribromophenol				*85.8*	*61.0*	*10.0-153*				

L986379-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L986379-02 04/26/18 17:29 • (MS) R3305136-4 04/26/18 17:53 • (MSD) R3305136-5 04/26/18 18:16

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
1,4-Dichlorobenzene	0.500	ND	0.219	0.239	43.8	47.8	1	12.0-125			8.75	23
2,4-Dinitrotoluene	0.500	ND	0.327	0.345	65.3	68.9	1	30.0-156			5.39	29
Hexachlorobenzene	0.500	ND	0.299	0.321	59.8	64.2	1	29.0-144			7.08	33
Hexachloro-1,3-butadiene	0.500	ND	0.254	0.284	50.7	56.8	1	18.0-122			11.4	35
Hexachloroethane	0.500	ND	0.197	0.229	39.3	45.8	1	12.0-120			15.3	36
Nitrobenzene	0.500	ND	0.205	0.229	40.9	45.9	1	14.0-134			11.4	32
Pyridine	0.500	ND	0.194	0.214	38.8	42.8	1	10.0-120			9.77	40
2-Methylphenol	0.500	ND	0.178	0.190	35.6	38.1	1	14.0-120			6.72	29
3&4-Methyl Phenol	0.500	ND	0.168	0.186	33.5	37.2	1	13.0-124			10.3	26
Pentachlorophenol	0.500	ND	0.311	0.334	62.3	66.8	1	10.0-160			6.99	40
2,4,5-Trichlorophenol	0.500	ND	0.264	0.280	52.8	56.1	1	15.0-160			6.04	27
2,4,6-Trichlorophenol	0.500	ND	0.268	0.292	53.7	58.5	1	10.0-153			8.58	29
(S) Nitrobenzene-d5					*42.6*	*50.3*		*10.0-126*				
(S) 2-Fluorobiphenyl					*51.6*	*57.0*		*22.0-127*				
(S) p-Terphenyl-d14					*70.2*	*71.7*		*29.0-141*				
(S) Phenol-d5					*15.4*	*17.2*		*10.0-120*				
(S) 2-Fluorophenol					*25.4*	*26.0*		*10.0-120*				
(S) 2,4,6-Tribromophenol					*75.3*	*79.9*		*10.0-153*				

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

(dry)	Results are reported based on the dry weight of the sample. [this will only be present on a dry report basis for soils].
MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state “ND” (Not Detected) or “BDL” (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
J	The identification of the analyte is acceptable; the reported value is an estimate.
J3	The associated batch QC was outside the established quality control range for precision.
J4	The associated batch QC was outside the established quality control range for accuracy.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.
V	The sample concentration is too high to evaluate accurate spike recoveries.

ESC Lab Sciences is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.
* Not all certifications held by the laboratory are applicable to the results reported in the attached report.
* Accreditation is only applicable to the test methods specified on each scope of accreditation held by ESC Lab Sciences.

State Accreditations

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN-03-2002-34
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico [1]	n/a
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina [1]	DW21704
Georgia	NELAP	North Carolina [3]	41
Georgia [1]	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LAO00356
Kentucky [1 6]	90010	South Carolina	84004
Kentucky [2]	16	South Dakota	n/a
Louisiana	AI30792	Tennessee [1 4]	2006
Louisiana [1]	LA180010	Texas	T 104704245-17-14
Maine	TN0002	Texas [5]	LAB0152
Maryland	324	Utah	TN00003
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	460132
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA

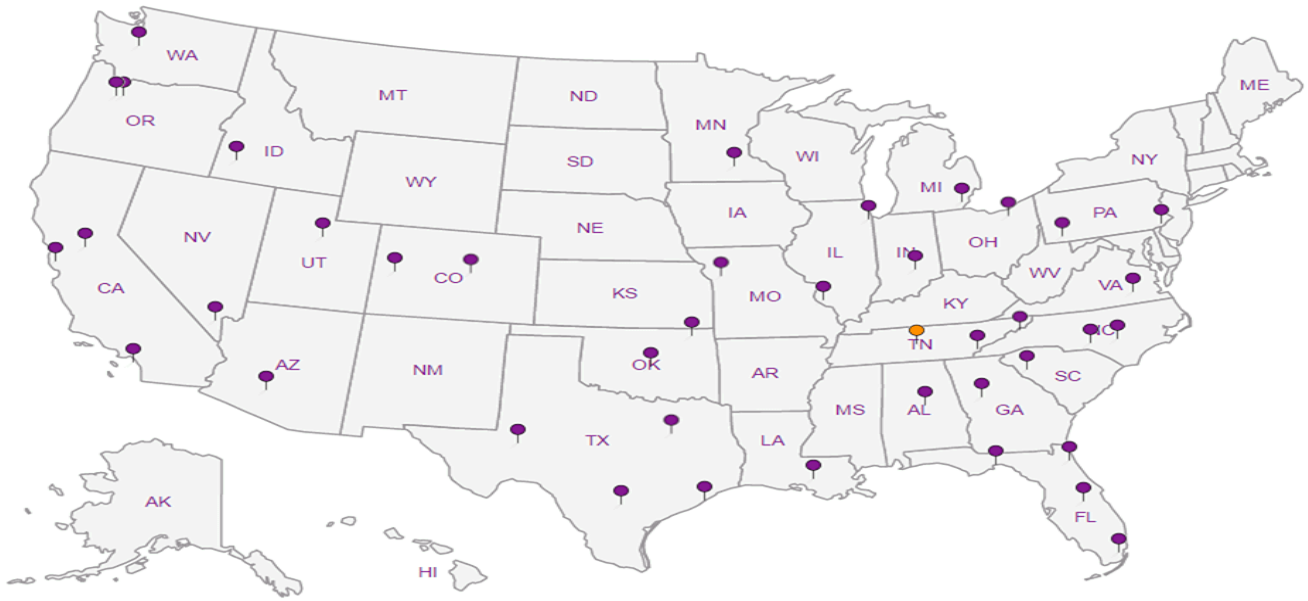
Third Party Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA – ISO 17025 [5]	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold [6] Wastewater n/a Accreditation not applicable

Our Locations

ESC Lab Sciences has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. ESC Lab Sciences performs all testing at our central laboratory.



S&ME Inc. - Knoxville
1413 Topside Rd
Louisville, TN 37777

Billing Information:
Accounts Payable
1413 Topside Rd
Louisville, TN 37777

Pres Chk

Analysis / Container / Preservative

Chain of Custody Page 1 of 1

ESC LABS SCIENCES
a subsidiary of Pace Analytical
12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

L# L986379
H157

Acctnum: SME
Template:
Prelogin:
TSR: 690 - Tom Mellette
PB:
Shipped Via:

Report to: N. Peterson
Email To: npeterson@smeinc.com
Project Description: Sanitary Laundry
City/State Collected: Knoxville, TN
Phone: 865-970-0003
Fax: 865-970-2312
Client Project # 4143-17-016
Lab Project #
Collected by (print): N. Peterson
Site/Facility ID #
P.O. #
Collected by (signature):
Immediately Packed on Ice N ___ Y X
Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day
Date Results Needed
Quote #

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	TAL	TCL	EPH	TCLP	Remarks	Sample # (lab only)
Basement Drums	G	OT	—	4/16/18	1145	4	x	x	x	x		-01

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other Drum Contents

Remarks: * Level III Data Package

Samples returned via: __ UPS X FedEx __ Courier

Tracking # 6777 0004 7689

pH _____ Temp _____
Flow _____ Other _____

Sample Receipt Checklist
COC Seal Present/Intact: NP __Y __N
COC Signed/Accurate: __Y __N
Bottles arrive intact: __Y __N
Correct bottles used: __Y __N
Sufficient volume sent: __Y __N
If Applicable
VOA Zero Headspace: __Y __N
Preservation Correct/Checked: __Y __N

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)
	4/16/18	1345	
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)
	4-16-18	1700	
Relinquished by: (Signature)	Date:	Time:	Received for lab by: (Signature)

Trip Blank Received: Yes / No
HCL / MeoH
TBR

Temp: 0.3 °C Bottles Received: 4

If preservation required by Login: Date/Time

Hold:

Condition: NCF / OK

Date: 4/17/18 Time: 0845

ESCKN

ANALYTICAL REPORT

February 07, 2018

S&ME Inc. - Knoxville

Sample Delivery Group:	L966581
Samples Received:	01/31/2018
Project Number:	
Description:	Sanitary Laundary

Report To:

Josh Rowe
1413 Topside Rd
Louisville, TN 37777

Entire Report Reviewed By:

Tom Mellette
Technical Service Representative

TABLE OF CONTENTS

S1 L966581-01 Solid

Collected by: Josh Rowe
Collected date/time: 01/30/18 13:00
Received date/time: 01/31/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1068503	1	01/31/18 09:49	01/31/18 16:59	BMB
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1070279	1	01/31/18 09:49	02/06/18 14:40	BMB
Semi-Volatile Organic Compounds (GC) by Method EPH	WG1068424	10	01/31/18 14:08	01/31/18 21:15	MTJ
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG1068423	10	02/01/18 06:47	02/04/18 16:35	CJR
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG1068423	10	02/01/18 06:47	02/05/18 15:04	CJR

S2 L966581-02 Solid

Collected by: Josh Rowe
Collected date/time: 01/30/18 13:30
Received date/time: 01/31/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1068503	1	01/31/18 09:49	01/31/18 17:19	BMB
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1070279	500	01/31/18 09:49	02/06/18 19:15	BMB
Semi-Volatile Organic Compounds (GC) by Method EPH	WG1068424	1	01/31/18 14:08	01/31/18 19:52	MTJ
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG1068423	1	02/01/18 06:47	02/03/18 02:08	CJR

S3 L966581-03 Solid

Collected by: Josh Rowe
Collected date/time: 01/30/18 14:00
Received date/time: 01/31/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1068503	1	01/31/18 09:49	01/31/18 17:38	BMB
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1070279	1	01/31/18 09:49	02/06/18 15:01	BMB
Semi-Volatile Organic Compounds (GC) by Method EPH	WG1068424	1	01/31/18 14:08	01/31/18 20:34	MTJ
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG1068423	1	02/01/18 06:47	02/03/18 02:32	CJR

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All radiochemical sample results for solids are reported on a dry weight basis with the exception of tritium, carbon-14 and radon, unless wet weight was requested by the client. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Tom Mellette
Technical Service Representative

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Acetone	ND		0.0500	1	01/31/2018 16:59	WG1068503
Acrylonitrile	ND		0.0100	1	01/31/2018 16:59	WG1068503
Benzene	ND		0.00100	1	01/31/2018 16:59	WG1068503
Bromobenzene	ND		0.00100	1	01/31/2018 16:59	WG1068503
Bromodichloromethane	ND		0.00100	1	01/31/2018 16:59	WG1068503
Bromoform	ND		0.00100	1	01/31/2018 16:59	WG1068503
Bromomethane	ND		0.00500	1	01/31/2018 16:59	WG1068503
n-Butylbenzene	ND		0.00100	1	01/31/2018 16:59	WG1068503
sec-Butylbenzene	ND		0.00100	1	01/31/2018 16:59	WG1068503
tert-Butylbenzene	ND		0.00100	1	01/31/2018 16:59	WG1068503
Carbon tetrachloride	ND		0.00100	1	01/31/2018 16:59	WG1068503
Chlorobenzene	ND		0.00100	1	01/31/2018 16:59	WG1068503
Chlorodibromomethane	ND		0.00100	1	01/31/2018 16:59	WG1068503
Chloroethane	ND		0.00500	1	01/31/2018 16:59	WG1068503
Chloroform	ND		0.00500	1	01/31/2018 16:59	WG1068503
Chloromethane	ND		0.00250	1	01/31/2018 16:59	WG1068503
2-Chlorotoluene	ND		0.00100	1	01/31/2018 16:59	WG1068503
4-Chlorotoluene	ND		0.00100	1	01/31/2018 16:59	WG1068503
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	01/31/2018 16:59	WG1068503
1,2-Dibromoethane	ND		0.00100	1	01/31/2018 16:59	WG1068503
Dibromomethane	ND		0.00100	1	01/31/2018 16:59	WG1068503
1,2-Dichlorobenzene	ND		0.00100	1	01/31/2018 16:59	WG1068503
1,3-Dichlorobenzene	ND		0.00100	1	01/31/2018 16:59	WG1068503
1,4-Dichlorobenzene	ND		0.00100	1	01/31/2018 16:59	WG1068503
Dichlorodifluoromethane	ND		0.00500	1	01/31/2018 16:59	WG1068503
1,1-Dichloroethane	ND		0.00100	1	01/31/2018 16:59	WG1068503
1,2-Dichloroethane	ND		0.00100	1	01/31/2018 16:59	WG1068503
1,1-Dichloroethene	ND		0.00100	1	01/31/2018 16:59	WG1068503
cis-1,2-Dichloroethene	ND		0.00100	1	01/31/2018 16:59	WG1068503
trans-1,2-Dichloroethene	ND		0.00100	1	01/31/2018 16:59	WG1068503
1,2-Dichloropropane	ND		0.00100	1	01/31/2018 16:59	WG1068503
1,1-Dichloropropene	ND		0.00100	1	01/31/2018 16:59	WG1068503
1,3-Dichloropropane	ND		0.00100	1	01/31/2018 16:59	WG1068503
cis-1,3-Dichloropropene	ND		0.00100	1	01/31/2018 16:59	WG1068503
trans-1,3-Dichloropropene	ND		0.00100	1	01/31/2018 16:59	WG1068503
2,2-Dichloropropane	ND		0.00100	1	01/31/2018 16:59	WG1068503
Di-isopropyl ether	ND		0.00100	1	01/31/2018 16:59	WG1068503
Ethylbenzene	ND		0.00100	1	02/06/2018 14:40	WG1070279
Hexachloro-1,3-butadiene	ND		0.00100	1	01/31/2018 16:59	WG1068503
Isopropylbenzene	ND		0.00100	1	01/31/2018 16:59	WG1068503
p-Isopropyltoluene	ND		0.00100	1	01/31/2018 16:59	WG1068503
2-Butanone (MEK)	ND		0.0100	1	01/31/2018 16:59	WG1068503
Methylene Chloride	ND		0.00500	1	01/31/2018 16:59	WG1068503
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	01/31/2018 16:59	WG1068503
Methyl tert-butyl ether	ND		0.00100	1	01/31/2018 16:59	WG1068503
Naphthalene	ND		0.00500	1	01/31/2018 16:59	WG1068503
n-Propylbenzene	ND		0.00100	1	01/31/2018 16:59	WG1068503
Styrene	ND		0.00100	1	01/31/2018 16:59	WG1068503
1,1,1,2-Tetrachloroethane	ND		0.00100	1	01/31/2018 16:59	WG1068503
1,1,2,2-Tetrachloroethane	ND		0.00100	1	01/31/2018 16:59	WG1068503
1,1,2-Trichlorotrifluoroethane	ND		0.00100	1	01/31/2018 16:59	WG1068503
Tetrachloroethene	0.0156		0.00100	1	01/31/2018 16:59	WG1068503
Toluene	ND		0.00500	1	01/31/2018 16:59	WG1068503
1,2,3-Trichlorobenzene	ND		0.00100	1	01/31/2018 16:59	WG1068503
1,2,4-Trichlorobenzene	ND		0.00100	1	01/31/2018 16:59	WG1068503
1,1,1-Trichloroethane	ND		0.00100	1	01/31/2018 16:59	WG1068503

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
1,1,2-Trichloroethane	ND		0.00100	1	01/31/2018 16:59	WG1068503
Trichloroethene	ND		0.00100	1	01/31/2018 16:59	WG1068503
Trichlorofluoromethane	ND		0.00500	1	01/31/2018 16:59	WG1068503
1,2,3-Trichloropropane	ND		0.00250	1	01/31/2018 16:59	WG1068503
1,2,4-Trimethylbenzene	ND		0.00100	1	01/31/2018 16:59	WG1068503
1,2,3-Trimethylbenzene	ND		0.00100	1	01/31/2018 16:59	WG1068503
1,3,5-Trimethylbenzene	ND		0.00100	1	01/31/2018 16:59	WG1068503
Vinyl chloride	ND		0.00100	1	01/31/2018 16:59	WG1068503
Xylenes, Total	ND		0.00300	1	02/06/2018 14:40	WG1070279
(S) Toluene-d8	*94.3*		*80.0-120*		*01/31/2018 16:59*	WG1068503
(S) Toluene-d8	*87.7*		*80.0-120*		*02/06/2018 14:40*	WG1070279
(S) Dibromofluoromethane	*102*		*74.0-131*		*01/31/2018 16:59*	WG1068503
(S) Dibromofluoromethane	*113*		*74.0-131*		*02/06/2018 14:40*	WG1070279
(S) 4-Bromofluorobenzene	*135*	J1	*64.0-132*		*01/31/2018 16:59*	WG1068503
(S) 4-Bromofluorobenzene	*124*		*64.0-132*		*02/06/2018 14:40*	WG1070279

Semi-Volatile Organic Compounds (GC) by Method EPH

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Extractable Petroleum Hydrocarbon	151		40.0	10	01/31/2018 21:15	WG1068424
(S) o-Terphenyl	*67.3*		*18.0-148*		*01/31/2018 21:15*	WG1068424

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Acenaphthene	ND		0.330	10	02/04/2018 16:35	WG1068423
Acenaphthylene	ND		0.330	10	02/04/2018 16:35	WG1068423
Anthracene	ND		0.330	10	02/04/2018 16:35	WG1068423
Benzidine	ND	J4	3.33	10	02/04/2018 16:35	WG1068423
Benzo(a)anthracene	ND		0.330	10	02/04/2018 16:35	WG1068423
Benzo(b)fluoranthene	ND		0.330	10	02/04/2018 16:35	WG1068423
Benzo(k)fluoranthene	ND		0.330	10	02/04/2018 16:35	WG1068423
Benzo(g,h,i)perylene	ND		0.330	10	02/04/2018 16:35	WG1068423
Benzo(a)pyrene	ND		0.330	10	02/04/2018 16:35	WG1068423
Bis(2-chlorethoxy)methane	ND		3.33	10	02/04/2018 16:35	WG1068423
Bis(2-chloroethyl)ether	ND		3.33	10	02/04/2018 16:35	WG1068423
Bis(2-chloroisopropyl)ether	ND		3.33	10	02/04/2018 16:35	WG1068423
4-Bromophenyl-phenylether	ND		3.33	10	02/04/2018 16:35	WG1068423
2-Chloronaphthalene	ND		0.330	10	02/04/2018 16:35	WG1068423
4-Chlorophenyl-phenylether	ND		3.33	10	02/04/2018 16:35	WG1068423
Chrysene	ND		0.330	10	02/04/2018 16:35	WG1068423
Dibenz(a,h)anthracene	ND		0.330	10	02/04/2018 16:35	WG1068423
3,3-Dichlorobenzidine	ND		3.33	10	02/04/2018 16:35	WG1068423
2,4-Dinitrotoluene	ND		3.33	10	02/04/2018 16:35	WG1068423
2,6-Dinitrotoluene	ND		3.33	10	02/04/2018 16:35	WG1068423
Fluoranthene	ND		0.330	10	02/04/2018 16:35	WG1068423
Fluorene	ND		0.330	10	02/04/2018 16:35	WG1068423
Hexachlorobenzene	ND		3.33	10	02/04/2018 16:35	WG1068423
Hexachloro-1,3-butadiene	ND		3.33	10	02/04/2018 16:35	WG1068423
Hexachlorocyclopentadiene	ND		3.33	10	02/04/2018 16:35	WG1068423
Hexachloroethane	ND		3.33	10	02/04/2018 16:35	WG1068423
Indeno(1,2,3-cd)pyrene	ND		0.330	10	02/04/2018 16:35	WG1068423
Isophorone	ND		3.33	10	02/04/2018 16:35	WG1068423
2-Methylnaphthalene	ND		0.330	10	02/04/2018 16:35	WG1068423
Naphthalene	ND		0.330	10	02/04/2018 16:35	WG1068423

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Nitrobenzene	ND		3.33	10	02/04/2018 16:35	WG1068423
n-Nitrosodimethylamine	ND		3.33	10	02/04/2018 16:35	WG1068423
n-Nitrosodiphenylamine	ND		3.33	10	02/04/2018 16:35	WG1068423
n-Nitrosodi-n-propylamine	ND		3.33	10	02/04/2018 16:35	WG1068423
Phenanthrene	ND		0.330	10	02/04/2018 16:35	WG1068423
Benzylbutyl phthalate	ND		3.33	10	02/04/2018 16:35	WG1068423
Bis(2-ethylhexyl)phthalate	ND		3.33	10	02/04/2018 16:35	WG1068423
Di-n-butyl phthalate	ND		3.33	10	02/04/2018 16:35	WG1068423
Diethyl phthalate	ND		3.33	10	02/04/2018 16:35	WG1068423
Dimethyl phthalate	ND		3.33	10	02/04/2018 16:35	WG1068423
Di-n-octyl phthalate	ND		3.33	10	02/04/2018 16:35	WG1068423
Pyrene	ND		0.330	10	02/04/2018 16:35	WG1068423
1,2,4-Trichlorobenzene	ND		3.33	10	02/04/2018 16:35	WG1068423
4-Chloro-3-methylphenol	ND		3.33	10	02/04/2018 16:35	WG1068423
2-Chlorophenol	ND		3.33	10	02/04/2018 16:35	WG1068423
2,4-Dichlorophenol	ND		3.33	10	02/04/2018 16:35	WG1068423
2,4-Dimethylphenol	ND		3.33	10	02/04/2018 16:35	WG1068423
4,6-Dinitro-2-methylphenol	ND		3.33	10	02/04/2018 16:35	WG1068423
2,4-Dinitrophenol	ND		3.33	10	02/05/2018 15:04	WG1068423
2-Nitrophenol	ND		3.33	10	02/04/2018 16:35	WG1068423
4-Nitrophenol	ND	J3	3.33	10	02/05/2018 15:04	WG1068423
Pentachlorophenol	ND		3.33	10	02/04/2018 16:35	WG1068423
Phenol	ND		3.33	10	02/04/2018 16:35	WG1068423
2,4,6-Trichlorophenol	ND		3.33	10	02/04/2018 16:35	WG1068423
(S) Nitrobenzene-d5	*35.7*		*18.0-125*		*02/05/2018 15:04*	WG1068423
(S) Nitrobenzene-d5	*35.5*		*18.0-125*		*02/04/2018 16:35*	WG1068423
(S) 2-Fluorobiphenyl	*39.1*		*28.0-120*		*02/05/2018 15:04*	WG1068423
(S) 2-Fluorobiphenyl	*37.7*		*28.0-120*		*02/04/2018 16:35*	WG1068423
(S) p-Terphenyl-d14	*34.7*		*13.0-131*		*02/05/2018 15:04*	WG1068423
(S) p-Terphenyl-d14	*36.2*		*13.0-131*		*02/04/2018 16:35*	WG1068423
(S) Phenol-d5	*35.7*		*20.0-120*		*02/04/2018 16:35*	WG1068423
(S) Phenol-d5	*37.8*		*20.0-120*		*02/05/2018 15:04*	WG1068423
(S) 2-Fluorophenol	*38.8*		*20.0-120*		*02/04/2018 16:35*	WG1068423
(S) 2-Fluorophenol	*40.1*		*20.0-120*		*02/05/2018 15:04*	WG1068423
(S) 2,4,6-Tribromophenol	*42.0*		*17.0-137*		*02/05/2018 15:04*	WG1068423
(S) 2,4,6-Tribromophenol	*38.7*		*17.0-137*		*02/04/2018 16:35*	WG1068423

Sample Narrative:

L966581-01 WG1068423: Dilution due to matrix

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Acetone	ND		0.0500	1	01/31/2018 17:19	WG1068503
Acrylonitrile	ND		0.0100	1	01/31/2018 17:19	WG1068503
Benzene	ND		0.00100	1	01/31/2018 17:19	WG1068503
Bromobenzene	ND		0.00100	1	01/31/2018 17:19	WG1068503
Bromodichloromethane	ND		0.00100	1	01/31/2018 17:19	WG1068503
Bromoform	ND		0.00100	1	01/31/2018 17:19	WG1068503
Bromomethane	ND		0.00500	1	01/31/2018 17:19	WG1068503
n-Butylbenzene	ND		0.00100	1	01/31/2018 17:19	WG1068503
sec-Butylbenzene	ND		0.00100	1	01/31/2018 17:19	WG1068503
tert-Butylbenzene	ND		0.00100	1	01/31/2018 17:19	WG1068503
Carbon tetrachloride	ND		0.00100	1	01/31/2018 17:19	WG1068503
Chlorobenzene	ND		0.00100	1	01/31/2018 17:19	WG1068503
Chlorodibromomethane	ND		0.00100	1	01/31/2018 17:19	WG1068503
Chloroethane	ND		0.00500	1	01/31/2018 17:19	WG1068503
Chloroform	ND		0.00500	1	01/31/2018 17:19	WG1068503
Chloromethane	ND		0.00250	1	01/31/2018 17:19	WG1068503
2-Chlorotoluene	ND		0.00100	1	01/31/2018 17:19	WG1068503
4-Chlorotoluene	ND		0.00100	1	01/31/2018 17:19	WG1068503
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	01/31/2018 17:19	WG1068503
1,2-Dibromoethane	ND		0.00100	1	01/31/2018 17:19	WG1068503
Dibromomethane	ND		0.00100	1	01/31/2018 17:19	WG1068503
1,2-Dichlorobenzene	0.00123		0.00100	1	01/31/2018 17:19	WG1068503
1,3-Dichlorobenzene	ND		0.00100	1	01/31/2018 17:19	WG1068503
1,4-Dichlorobenzene	ND		0.00100	1	01/31/2018 17:19	WG1068503
Dichlorodifluoromethane	ND		0.00500	1	01/31/2018 17:19	WG1068503
1,1-Dichloroethane	ND		0.00100	1	01/31/2018 17:19	WG1068503
1,2-Dichloroethane	ND		0.00100	1	01/31/2018 17:19	WG1068503
1,1-Dichloroethene	ND		0.00100	1	01/31/2018 17:19	WG1068503
cis-1,2-Dichloroethene	0.0227		0.00100	1	01/31/2018 17:19	WG1068503
trans-1,2-Dichloroethene	ND		0.00100	1	01/31/2018 17:19	WG1068503
1,2-Dichloropropane	ND		0.00100	1	01/31/2018 17:19	WG1068503
1,1-Dichloropropene	ND		0.00100	1	01/31/2018 17:19	WG1068503
1,3-Dichloropropane	ND		0.00100	1	01/31/2018 17:19	WG1068503
cis-1,3-Dichloropropene	ND		0.00100	1	01/31/2018 17:19	WG1068503
trans-1,3-Dichloropropene	ND		0.00100	1	01/31/2018 17:19	WG1068503
2,2-Dichloropropane	ND		0.00100	1	01/31/2018 17:19	WG1068503
Di-isopropyl ether	ND		0.00100	1	01/31/2018 17:19	WG1068503
Ethylbenzene	ND		0.500	500	02/06/2018 19:15	WG1070279
Hexachloro-1,3-butadiene	ND		0.00100	1	01/31/2018 17:19	WG1068503
Isopropylbenzene	ND		0.00100	1	01/31/2018 17:19	WG1068503
p-Isopropyltoluene	ND		0.00100	1	01/31/2018 17:19	WG1068503
2-Butanone (MEK)	ND		0.0100	1	01/31/2018 17:19	WG1068503
Methylene Chloride	ND		0.00500	1	01/31/2018 17:19	WG1068503
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	01/31/2018 17:19	WG1068503
Methyl tert-butyl ether	ND		0.00100	1	01/31/2018 17:19	WG1068503
Naphthalene	ND		0.00500	1	01/31/2018 17:19	WG1068503
n-Propylbenzene	ND		0.00100	1	01/31/2018 17:19	WG1068503
Styrene	ND		0.00100	1	01/31/2018 17:19	WG1068503
1,1,1,2-Tetrachloroethane	ND		0.00100	1	01/31/2018 17:19	WG1068503
1,1,2,2-Tetrachloroethane	ND		0.00100	1	01/31/2018 17:19	WG1068503
1,1,2-Trichlorotrifluoroethane	ND		0.00100	1	01/31/2018 17:19	WG1068503
Tetrachloroethene	28.0		0.500	500	02/06/2018 19:15	WG1070279
Toluene	ND		0.00500	1	01/31/2018 17:19	WG1068503
1,2,3-Trichlorobenzene	ND		0.00100	1	01/31/2018 17:19	WG1068503
1,2,4-Trichlorobenzene	ND		0.00100	1	01/31/2018 17:19	WG1068503
1,1,1-Trichloroethane	ND		0.00100	1	01/31/2018 17:19	WG1068503

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
1,1,2-Trichloroethane	ND		0.00100	1	01/31/2018 17:19	WG1068503
Trichloroethene	0.0215		0.00100	1	01/31/2018 17:19	WG1068503
Trichlorofluoromethane	ND		0.00500	1	01/31/2018 17:19	WG1068503
1,2,3-Trichloropropane	ND		0.00250	1	01/31/2018 17:19	WG1068503
1,2,4-Trimethylbenzene	ND		0.00100	1	01/31/2018 17:19	WG1068503
1,2,3-Trimethylbenzene	ND		0.00100	1	01/31/2018 17:19	WG1068503
1,3,5-Trimethylbenzene	ND		0.00100	1	01/31/2018 17:19	WG1068503
Vinyl chloride	ND		0.00100	1	01/31/2018 17:19	WG1068503
Xylenes, Total	ND		1.50	500	02/06/2018 19:15	WG1070279
(S) Toluene-d8	*100*		*80.0-120*		*02/06/2018 19:15*	WG1070279
(S) Toluene-d8	*93.4*		*80.0-120*		*01/31/2018 17:19*	WG1068503
(S) Dibromofluoromethane	*103*		*74.0-131*		*02/06/2018 19:15*	WG1070279
(S) Dibromofluoromethane	*98.7*		*74.0-131*		*01/31/2018 17:19*	WG1068503
(S) 4-Bromofluorobenzene	*103*		*64.0-132*		*02/06/2018 19:15*	WG1070279
(S) 4-Bromofluorobenzene	*103*		*64.0-132*		*01/31/2018 17:19*	WG1068503

Semi-Volatile Organic Compounds (GC) by Method EPH

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Extractable Petroleum Hydrocarbon	ND		4.00	1	01/31/2018 19:52	WG1068424
(S) o-Terphenyl	*98.1*		*18.0-148*		*01/31/2018 19:52*	WG1068424

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Acenaphthene	ND		0.0330	1	02/03/2018 02:08	WG1068423
Acenaphthylene	ND		0.0330	1	02/03/2018 02:08	WG1068423
Anthracene	ND		0.0330	1	02/03/2018 02:08	WG1068423
Benzidine	ND	J4	0.333	1	02/03/2018 02:08	WG1068423
Benzo(a)anthracene	ND		0.0330	1	02/03/2018 02:08	WG1068423
Benzo(b)fluoranthene	ND		0.0330	1	02/03/2018 02:08	WG1068423
Benzo(k)fluoranthene	ND		0.0330	1	02/03/2018 02:08	WG1068423
Benzo(g,h,i)perylene	ND		0.0330	1	02/03/2018 02:08	WG1068423
Benzo(a)pyrene	ND		0.0330	1	02/03/2018 02:08	WG1068423
Bis(2-chlorethoxy)methane	ND		0.333	1	02/03/2018 02:08	WG1068423
Bis(2-chloroethyl)ether	ND		0.333	1	02/03/2018 02:08	WG1068423
Bis(2-chloroisopropyl)ether	ND		0.333	1	02/03/2018 02:08	WG1068423
4-Bromophenyl-phenylether	ND		0.333	1	02/03/2018 02:08	WG1068423
2-Chloronaphthalene	ND		0.0330	1	02/03/2018 02:08	WG1068423
4-Chlorophenyl-phenylether	ND		0.333	1	02/03/2018 02:08	WG1068423
Chrysene	ND		0.0330	1	02/03/2018 02:08	WG1068423
Dibenz(a,h)anthracene	ND		0.0330	1	02/03/2018 02:08	WG1068423
3,3-Dichlorobenzidine	ND		0.333	1	02/03/2018 02:08	WG1068423
2,4-Dinitrotoluene	ND		0.333	1	02/03/2018 02:08	WG1068423
2,6-Dinitrotoluene	ND		0.333	1	02/03/2018 02:08	WG1068423
Fluoranthene	ND		0.0330	1	02/03/2018 02:08	WG1068423
Fluorene	ND		0.0330	1	02/03/2018 02:08	WG1068423
Hexachlorobenzene	ND		0.333	1	02/03/2018 02:08	WG1068423
Hexachloro-1,3-butadiene	ND		0.333	1	02/03/2018 02:08	WG1068423
Hexachlorocyclopentadiene	ND		0.333	1	02/03/2018 02:08	WG1068423
Hexachloroethane	ND		0.333	1	02/03/2018 02:08	WG1068423
Indeno(1,2,3-cd)pyrene	ND		0.0330	1	02/03/2018 02:08	WG1068423
Isophorone	ND		0.333	1	02/03/2018 02:08	WG1068423
2-Methylnaphthalene	ND		0.0330	1	02/03/2018 02:08	WG1068423
Naphthalene	ND		0.0330	1	02/03/2018 02:08	WG1068423

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Nitrobenzene	ND		0.333	1	02/03/2018 02:08	WG1068423
n-Nitrosodimethylamine	ND		0.333	1	02/03/2018 02:08	WG1068423
n-Nitrosodiphenylamine	ND		0.333	1	02/03/2018 02:08	WG1068423
n-Nitrosodi-n-propylamine	ND		0.333	1	02/03/2018 02:08	WG1068423
Phenanthrene	ND		0.0330	1	02/03/2018 02:08	WG1068423
Benzylbutyl phthalate	ND		0.333	1	02/03/2018 02:08	WG1068423
Bis(2-ethylhexyl)phthalate	ND		0.333	1	02/03/2018 02:08	WG1068423
Di-n-butyl phthalate	ND		0.333	1	02/03/2018 02:08	WG1068423
Diethyl phthalate	ND		0.333	1	02/03/2018 02:08	WG1068423
Dimethyl phthalate	ND		0.333	1	02/03/2018 02:08	WG1068423
Di-n-octyl phthalate	ND		0.333	1	02/03/2018 02:08	WG1068423
Pyrene	ND		0.0330	1	02/03/2018 02:08	WG1068423
1,2,4-Trichlorobenzene	ND		0.333	1	02/03/2018 02:08	WG1068423
4-Chloro-3-methylphenol	ND		0.333	1	02/03/2018 02:08	WG1068423
2-Chlorophenol	ND		0.333	1	02/03/2018 02:08	WG1068423
2,4-Dichlorophenol	ND		0.333	1	02/03/2018 02:08	WG1068423
2,4-Dimethylphenol	ND		0.333	1	02/03/2018 02:08	WG1068423
4,6-Dinitro-2-methylphenol	ND		0.333	1	02/03/2018 02:08	WG1068423
2,4-Dinitrophenol	ND		0.333	1	02/03/2018 02:08	WG1068423
2-Nitrophenol	ND		0.333	1	02/03/2018 02:08	WG1068423
4-Nitrophenol	ND	J3	0.333	1	02/03/2018 02:08	WG1068423
Pentachlorophenol	ND		0.333	1	02/03/2018 02:08	WG1068423
Phenol	ND		0.333	1	02/03/2018 02:08	WG1068423
2,4,6-Trichlorophenol	ND		0.333	1	02/03/2018 02:08	WG1068423
(S) Nitrobenzene-d5	*49.4*		*18.0-125*		*02/03/2018 02:08*	WG1068423
(S) 2-Fluorobiphenyl	*50.7*		*28.0-120*		*02/03/2018 02:08*	WG1068423
(S) p-Terphenyl-d14	*43.3*		*13.0-131*		*02/03/2018 02:08*	WG1068423
(S) Phenol-d5	*45.6*		*20.0-120*		*02/03/2018 02:08*	WG1068423
(S) 2-Fluorophenol	*49.3*		*20.0-120*		*02/03/2018 02:08*	WG1068423
(S) 2,4,6-Tribromophenol	*53.0*		*17.0-137*		*02/03/2018 02:08*	WG1068423

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Acetone	ND		0.0500	1	01/31/2018 17:38	WG1068503
Acrylonitrile	ND		0.0100	1	01/31/2018 17:38	WG1068503
Benzene	ND		0.00100	1	01/31/2018 17:38	WG1068503
Bromobenzene	ND		0.00100	1	01/31/2018 17:38	WG1068503
Bromodichloromethane	ND		0.00100	1	01/31/2018 17:38	WG1068503
Bromoform	ND		0.00100	1	01/31/2018 17:38	WG1068503
Bromomethane	ND		0.00500	1	01/31/2018 17:38	WG1068503
n-Butylbenzene	ND		0.00100	1	01/31/2018 17:38	WG1068503
sec-Butylbenzene	ND		0.00100	1	01/31/2018 17:38	WG1068503
tert-Butylbenzene	ND		0.00100	1	01/31/2018 17:38	WG1068503
Carbon tetrachloride	ND		0.00100	1	01/31/2018 17:38	WG1068503
Chlorobenzene	ND		0.00100	1	01/31/2018 17:38	WG1068503
Chlorodibromomethane	ND		0.00100	1	01/31/2018 17:38	WG1068503
Chloroethane	ND		0.00500	1	01/31/2018 17:38	WG1068503
Chloroform	ND		0.00500	1	01/31/2018 17:38	WG1068503
Chloromethane	ND		0.00250	1	01/31/2018 17:38	WG1068503
2-Chlorotoluene	ND		0.00100	1	01/31/2018 17:38	WG1068503
4-Chlorotoluene	ND		0.00100	1	01/31/2018 17:38	WG1068503
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	01/31/2018 17:38	WG1068503
1,2-Dibromoethane	ND		0.00100	1	01/31/2018 17:38	WG1068503
Dibromomethane	ND		0.00100	1	01/31/2018 17:38	WG1068503
1,2-Dichlorobenzene	ND		0.00100	1	01/31/2018 17:38	WG1068503
1,3-Dichlorobenzene	ND		0.00100	1	01/31/2018 17:38	WG1068503
1,4-Dichlorobenzene	ND		0.00100	1	01/31/2018 17:38	WG1068503
Dichlorodifluoromethane	ND		0.00500	1	01/31/2018 17:38	WG1068503
1,1-Dichloroethane	ND		0.00100	1	01/31/2018 17:38	WG1068503
1,2-Dichloroethane	ND		0.00100	1	01/31/2018 17:38	WG1068503
1,1-Dichloroethene	ND		0.00100	1	01/31/2018 17:38	WG1068503
cis-1,2-Dichloroethene	ND		0.00100	1	01/31/2018 17:38	WG1068503
trans-1,2-Dichloroethene	ND		0.00100	1	01/31/2018 17:38	WG1068503
1,2-Dichloropropane	ND		0.00100	1	01/31/2018 17:38	WG1068503
1,1-Dichloropropene	ND		0.00100	1	01/31/2018 17:38	WG1068503
1,3-Dichloropropane	ND		0.00100	1	01/31/2018 17:38	WG1068503
cis-1,3-Dichloropropene	ND		0.00100	1	01/31/2018 17:38	WG1068503
trans-1,3-Dichloropropene	ND		0.00100	1	01/31/2018 17:38	WG1068503
2,2-Dichloropropane	ND		0.00100	1	01/31/2018 17:38	WG1068503
Di-isopropyl ether	ND		0.00100	1	01/31/2018 17:38	WG1068503
Ethylbenzene	ND		0.00100	1	02/06/2018 15:01	WG1070279
Hexachloro-1,3-butadiene	ND		0.00100	1	01/31/2018 17:38	WG1068503
Isopropylbenzene	ND		0.00100	1	01/31/2018 17:38	WG1068503
p-Isopropyltoluene	ND		0.00100	1	01/31/2018 17:38	WG1068503
2-Butanone (MEK)	ND		0.0100	1	01/31/2018 17:38	WG1068503
Methylene Chloride	ND		0.00500	1	01/31/2018 17:38	WG1068503
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	01/31/2018 17:38	WG1068503
Methyl tert-butyl ether	ND		0.00100	1	01/31/2018 17:38	WG1068503
Naphthalene	ND		0.00500	1	01/31/2018 17:38	WG1068503
n-Propylbenzene	ND		0.00100	1	01/31/2018 17:38	WG1068503
Styrene	ND		0.00100	1	01/31/2018 17:38	WG1068503
1,1,1,2-Tetrachloroethane	ND		0.00100	1	01/31/2018 17:38	WG1068503
1,1,2,2-Tetrachloroethane	ND		0.00100	1	01/31/2018 17:38	WG1068503
1,1,2-Trichlorotrifluoroethane	ND		0.00100	1	01/31/2018 17:38	WG1068503
Tetrachloroethene	0.0102		0.00100	1	02/06/2018 15:01	WG1070279
Toluene	ND		0.00500	1	01/31/2018 17:38	WG1068503
1,2,3-Trichlorobenzene	ND		0.00100	1	01/31/2018 17:38	WG1068503
1,2,4-Trichlorobenzene	ND		0.00100	1	01/31/2018 17:38	WG1068503
1,1,1-Trichloroethane	ND		0.00100	1	01/31/2018 17:38	WG1068503

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
1,1,2-Trichloroethane	ND		0.00100	1	01/31/2018 17:38	WG1068503
Trichloroethene	ND		0.00100	1	01/31/2018 17:38	WG1068503
Trichlorofluoromethane	ND		0.00500	1	01/31/2018 17:38	WG1068503
1,2,3-Trichloropropane	ND		0.00250	1	01/31/2018 17:38	WG1068503
1,2,4-Trimethylbenzene	ND		0.00100	1	01/31/2018 17:38	WG1068503
1,2,3-Trimethylbenzene	ND		0.00100	1	01/31/2018 17:38	WG1068503
1,3,5-Trimethylbenzene	ND		0.00100	1	01/31/2018 17:38	WG1068503
Vinyl chloride	ND		0.00100	1	01/31/2018 17:38	WG1068503
Xylenes, Total	ND		0.00300	1	01/31/2018 17:38	WG1068503
(S) Toluene-d8	*98.4*		*80.0-120*		*01/31/2018 17:38*	WG1068503
(S) Toluene-d8	*92.7*		*80.0-120*		*02/06/2018 15:01*	WG1070279
(S) Dibromofluoromethane	*103*		*74.0-131*		*01/31/2018 17:38*	WG1068503
(S) Dibromofluoromethane	*114*		*74.0-131*		*02/06/2018 15:01*	WG1070279
(S) 4-Bromofluorobenzene	*104*		*64.0-132*		*01/31/2018 17:38*	WG1068503
(S) 4-Bromofluorobenzene	*112*		*64.0-132*		*02/06/2018 15:01*	WG1070279

Semi-Volatile Organic Compounds (GC) by Method EPH

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Extractable Petroleum Hydrocarbon	5.55		4.00	1	01/31/2018 20:34	WG1068424
(S) o-Terphenyl	*94.4*		*18.0-148*		*01/31/2018 20:34*	WG1068424

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Acenaphthene	ND		0.0330	1	02/03/2018 02:32	WG1068423
Acenaphthylene	ND		0.0330	1	02/03/2018 02:32	WG1068423
Anthracene	ND		0.0330	1	02/03/2018 02:32	WG1068423
Benzidine	ND	J4	0.333	1	02/03/2018 02:32	WG1068423
Benzo(a)anthracene	0.0842		0.0330	1	02/03/2018 02:32	WG1068423
Benzo(b)fluoranthene	0.100		0.0330	1	02/03/2018 02:32	WG1068423
Benzo(k)fluoranthene	0.0814		0.0330	1	02/03/2018 02:32	WG1068423
Benzo(g,h,i)perylene	0.0812		0.0330	1	02/03/2018 02:32	WG1068423
Benzo(a)pyrene	0.0990		0.0330	1	02/03/2018 02:32	WG1068423
Bis(2-chlorethoxy)methane	ND		0.333	1	02/03/2018 02:32	WG1068423
Bis(2-chloroethyl)ether	ND		0.333	1	02/03/2018 02:32	WG1068423
Bis(2-chloroisopropyl)ether	ND		0.333	1	02/03/2018 02:32	WG1068423
4-Bromophenyl-phenylether	ND		0.333	1	02/03/2018 02:32	WG1068423
2-Chloronaphthalene	ND		0.0330	1	02/03/2018 02:32	WG1068423
4-Chlorophenyl-phenylether	ND		0.333	1	02/03/2018 02:32	WG1068423
Chrysene	0.0881		0.0330	1	02/03/2018 02:32	WG1068423
Dibenz(a,h)anthracene	ND		0.0330	1	02/03/2018 02:32	WG1068423
3,3-Dichlorobenzidine	ND		0.333	1	02/03/2018 02:32	WG1068423
2,4-Dinitrotoluene	ND		0.333	1	02/03/2018 02:32	WG1068423
2,6-Dinitrotoluene	ND		0.333	1	02/03/2018 02:32	WG1068423
Fluoranthene	0.0963		0.0330	1	02/03/2018 02:32	WG1068423
Fluorene	ND		0.0330	1	02/03/2018 02:32	WG1068423
Hexachlorobenzene	ND		0.333	1	02/03/2018 02:32	WG1068423
Hexachloro-1,3-butadiene	ND		0.333	1	02/03/2018 02:32	WG1068423
Hexachlorocyclopentadiene	ND		0.333	1	02/03/2018 02:32	WG1068423
Hexachloroethane	ND		0.333	1	02/03/2018 02:32	WG1068423
Indeno(1,2,3-cd)pyrene	0.0733		0.0330	1	02/03/2018 02:32	WG1068423
Isophorone	ND		0.333	1	02/03/2018 02:32	WG1068423
2-Methylnaphthalene	0.0400		0.0330	1	02/03/2018 02:32	WG1068423
Naphthalene	ND		0.0330	1	02/03/2018 02:32	WG1068423

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Nitrobenzene	ND		0.333	1	02/03/2018 02:32	WG1068423
n-Nitrosodimethylamine	ND		0.333	1	02/03/2018 02:32	WG1068423
n-Nitrosodiphenylamine	ND		0.333	1	02/03/2018 02:32	WG1068423
n-Nitrosodi-n-propylamine	ND		0.333	1	02/03/2018 02:32	WG1068423
Phenanthrene	0.0331		0.0330	1	02/03/2018 02:32	WG1068423
Benzylbutyl phthalate	ND		0.333	1	02/03/2018 02:32	WG1068423
Bis(2-ethylhexyl)phthalate	ND		0.333	1	02/03/2018 02:32	WG1068423
Di-n-butyl phthalate	ND		0.333	1	02/03/2018 02:32	WG1068423
Diethyl phthalate	ND		0.333	1	02/03/2018 02:32	WG1068423
Dimethyl phthalate	ND		0.333	1	02/03/2018 02:32	WG1068423
Di-n-octyl phthalate	ND		0.333	1	02/03/2018 02:32	WG1068423
Pyrene	0.0911		0.0330	1	02/03/2018 02:32	WG1068423
1,2,4-Trichlorobenzene	ND		0.333	1	02/03/2018 02:32	WG1068423
4-Chloro-3-methylphenol	ND		0.333	1	02/03/2018 02:32	WG1068423
2-Chlorophenol	ND		0.333	1	02/03/2018 02:32	WG1068423
2,4-Dichlorophenol	ND		0.333	1	02/03/2018 02:32	WG1068423
2,4-Dimethylphenol	ND		0.333	1	02/03/2018 02:32	WG1068423
4,6-Dinitro-2-methylphenol	ND		0.333	1	02/03/2018 02:32	WG1068423
2,4-Dinitrophenol	ND		0.333	1	02/03/2018 02:32	WG1068423
2-Nitrophenol	ND		0.333	1	02/03/2018 02:32	WG1068423
4-Nitrophenol	ND	J3	0.333	1	02/03/2018 02:32	WG1068423
Pentachlorophenol	ND		0.333	1	02/03/2018 02:32	WG1068423
Phenol	ND		0.333	1	02/03/2018 02:32	WG1068423
2,4,6-Trichlorophenol	ND		0.333	1	02/03/2018 02:32	WG1068423
(S) Nitrobenzene-d5	*55.4*		*18.0-125*		*02/03/2018 02:32*	WG1068423
(S) 2-Fluorobiphenyl	*58.7*		*28.0-120*		*02/03/2018 02:32*	WG1068423
(S) p-Terphenyl-d14	*43.2*		*13.0-131*		*02/03/2018 02:32*	WG1068423
(S) Phenol-d5	*48.3*		*20.0-120*		*02/03/2018 02:32*	WG1068423
(S) 2-Fluorophenol	*52.0*		*20.0-120*		*02/03/2018 02:32*	WG1068423
(S) 2,4,6-Tribromophenol	*55.0*		*17.0-137*		*02/03/2018 02:32*	WG1068423

Method Blank (MB)

(MB) R3283893-3 01/31/18 11:31

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Acetone	U		0.0100	0.0500
Acrylonitrile	U		0.00179	0.0100
Benzene	U		0.000270	0.00100
Bromobenzene	U		0.000284	0.00100
Bromodichloromethane	U		0.000254	0.00100
Bromoform	U		0.000424	0.00100
Bromomethane	U		0.00134	0.00500
n-Butylbenzene	U		0.000258	0.00100
sec-Butylbenzene	U		0.000201	0.00100
tert-Butylbenzene	U		0.000206	0.00100
Carbon tetrachloride	U		0.000328	0.00100
Chlorobenzene	U		0.000212	0.00100
Chlorodibromomethane	U		0.000373	0.00100
Chloroethane	U		0.000946	0.00500
Chloroform	U		0.000229	0.00500
Chloromethane	U		0.000375	0.00250
2-Chlorotoluene	U		0.000301	0.00100
4-Chlorotoluene	U		0.000240	0.00100
1,2-Dibromo-3-Chloropropane	U		0.00105	0.00500
1,2-Dibromoethane	U		0.000343	0.00100
Dibromomethane	U		0.000382	0.00100
1,2-Dichlorobenzene	U		0.000305	0.00100
1,3-Dichlorobenzene	U		0.000239	0.00100
1,4-Dichlorobenzene	U		0.000226	0.00100
Dichlorodifluoromethane	U		0.000713	0.00500
1,1-Dichloroethane	U		0.000199	0.00100
1,2-Dichloroethane	U		0.000265	0.00100
1,1-Dichloroethene	U		0.000303	0.00100
cis-1,2-Dichloroethene	U		0.000235	0.00100
trans-1,2-Dichloroethene	U		0.000264	0.00100
1,2-Dichloropropane	U		0.000358	0.00100
1,1-Dichloropropene	U		0.000317	0.00100
1,3-Dichloropropane	U		0.000207	0.00100
cis-1,3-Dichloropropene	U		0.000262	0.00100
trans-1,3-Dichloropropene	U		0.000267	0.00100
2,2-Dichloropropane	U		0.000279	0.00100
Di-isopropyl ether	U		0.000248	0.00100
Hexachloro-1,3-butadiene	U		0.000342	0.00100
Isopropylbenzene	U		0.000243	0.00100
p-Isopropyltoluene	U		0.000204	0.00100

Method Blank (MB)

(MB) R3283893-3 01/31/18 11:31

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
2-Butanone (MEK)	U		0.00468	0.0100
Methylene Chloride	U		0.00100	0.00500
4-Methyl-2-pentanone (MIBK)	U		0.00188	0.0100
Methyl tert-butyl ether	U		0.000212	0.00100
Naphthalene	U		0.00100	0.00500
n-Propylbenzene	U		0.000206	0.00100
Styrene	U		0.000234	0.00100
1,1,1,2-Tetrachloroethane	U		0.000264	0.00100
1,1,2,2-Tetrachloroethane	U		0.000365	0.00100
Tetrachloroethene	U		0.000276	0.00100
Toluene	U		0.000434	0.00500
1,1,2-Trichlorotrifluoroethane	U		0.000365	0.00100
1,2,3-Trichlorobenzene	U		0.000306	0.00100
1,2,4-Trichlorobenzene	U		0.000388	0.00100
1,1,1-Trichloroethane	U		0.000286	0.00100
1,1,2-Trichloroethane	U		0.000277	0.00100
Trichloroethene	U		0.000279	0.00100
Trichlorofluoromethane	U		0.000382	0.00500
1,2,3-Trichloropropane	U		0.000741	0.00250
1,2,3-Trimethylbenzene	U		0.000287	0.00100
1,2,4-Trimethylbenzene	U		0.000211	0.00100
1,3,5-Trimethylbenzene	U		0.000266	0.00100
Vinyl chloride	U		0.000291	0.00100
Xylenes, Total	U		0.000698	0.00300
(S) Toluene-d8	*102*			*80.0-120*
(S) Dibromofluoromethane	*98.3*			*74.0-131*
(S) 4-Bromofluorobenzene	*99.7*			*64.0-132*

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3283893-1 01/31/18 09:47 • (LCSD) R3283893-2 01/31/18 10:06

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Acetone	0.125	0.0942	0.104	75.4	82.9	11.0-160			9.54	23
Acrylonitrile	0.125	0.109	0.121	87.0	96.7	61.0-143			10.6	20
Benzene	0.0250	0.0242	0.0245	96.9	98.1	71.0-124			1.24	20
Bromobenzene	0.0250	0.0245	0.0247	98.1	99.0	78.0-120			0.870	20
Bromodichloromethane	0.0250	0.0251	0.0247	100	99.0	75.0-120			1.43	20
Bromoform	0.0250	0.0263	0.0252	105	101	65.0-133			4.16	20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3283893-1 01/31/18 09:47 • (LCSD) R3283893-2 01/31/18 10:06

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Bromomethane	0.0250	0.0230	0.0230	92.1	92.1	26.0-160			0.00578	20
n-Butylbenzene	0.0250	0.0288	0.0280	115	112	73.0-126			2.56	20
sec-Butylbenzene	0.0250	0.0265	0.0260	106	104	75.0-121			1.66	20
tert-Butylbenzene	0.0250	0.0259	0.0260	104	104	74.0-122			0.321	20
Carbon tetrachloride	0.0250	0.0255	0.0262	102	105	66.0-123			2.60	20
Chlorobenzene	0.0250	0.0259	0.0261	104	105	79.0-121			1.04	20
Chlorodibromomethane	0.0250	0.0252	0.0252	101	101	74.0-128			0.101	20
Chloroethane	0.0250	0.0224	0.0231	89.7	92.4	51.0-147			3.04	20
Chloroform	0.0250	0.0249	0.0254	99.5	102	73.0-123			2.17	20
Chloromethane	0.0250	0.0227	0.0236	90.6	94.3	51.0-138			3.94	20
2-Chlorotoluene	0.0250	0.0254	0.0253	102	101	72.0-124			0.363	20
4-Chlorotoluene	0.0250	0.0258	0.0257	103	103	78.0-120			0.147	20
1,2-Dibromo-3-Chloropropane	0.0250	0.0266	0.0252	107	101	65.0-126			5.31	20
1,2-Dibromoethane	0.0250	0.0250	0.0245	100	97.9	78.0-122			2.26	20
Dibromomethane	0.0250	0.0257	0.0253	103	101	79.0-120			1.65	20
1,2-Dichlorobenzene	0.0250	0.0262	0.0256	105	102	80.0-120			2.39	20
1,3-Dichlorobenzene	0.0250	0.0262	0.0262	105	105	72.0-123			0.194	20
1,4-Dichlorobenzene	0.0250	0.0249	0.0243	99.6	97.3	77.0-120			2.37	20
Dichlorodifluoromethane	0.0250	0.0221	0.0227	88.2	91.0	49.0-155			3.08	20
1,1-Dichloroethane	0.0250	0.0251	0.0254	100	102	70.0-128			1.40	20
1,2-Dichloroethane	0.0250	0.0248	0.0255	99.4	102	69.0-128			2.74	20
1,1-Dichloroethene	0.0250	0.0225	0.0228	90.0	91.3	63.0-131			1.44	20
cis-1,2-Dichloroethene	0.0250	0.0247	0.0254	98.7	102	74.0-123			2.83	20
trans-1,2-Dichloroethene	0.0250	0.0244	0.0250	97.8	100	72.0-122			2.46	20
1,2-Dichloropropane	0.0250	0.0262	0.0264	105	106	75.0-126			0.677	20
1,1-Dichloropropene	0.0250	0.0252	0.0255	101	102	72.0-130			1.49	20
1,3-Dichloropropane	0.0250	0.0242	0.0241	96.7	96.6	80.0-121			0.0899	20
cis-1,3-Dichloropropene	0.0250	0.0260	0.0262	104	105	80.0-125			1.08	20
trans-1,3-Dichloropropene	0.0250	0.0265	0.0264	106	105	75.0-129			0.620	20
2,2-Dichloropropane	0.0250	0.0282	0.0307	113	123	60.0-129			8.53	20
Di-isopropyl ether	0.0250	0.0246	0.0251	98.4	100	62.0-133			1.94	20
Hexachloro-1,3-butadiene	0.0250	0.0271	0.0264	108	106	68.0-128			2.31	20
Isopropylbenzene	0.0250	0.0254	0.0252	102	101	75.0-120			0.896	20
p-Isopropyltoluene	0.0250	0.0274	0.0270	110	108	74.0-125			1.71	20
2-Butanone (MEK)	0.125	0.122	0.126	97.3	100	37.0-159			3.14	20
Methylene Chloride	0.0250	0.0234	0.0240	93.4	95.9	67.0-123			2.61	20
4-Methyl-2-pentanone (MIBK)	0.125	0.128	0.126	102	101	60.0-144			1.09	20
Methyl tert-butyl ether	0.0250	0.0242	0.0246	96.8	98.3	66.0-125			1.51	20
Naphthalene	0.0250	0.0247	0.0235	98.8	94.0	64.0-125			4.97	20
n-Propylbenzene	0.0250	0.0257	0.0254	103	102	78.0-120			0.912	20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3283893-1 01/31/18 09:47 • (LCSD) R3283893-2 01/31/18 10:06

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Styrene	0.0250	0.0276	0.0269	110	108	78.0-124			2.59	20
1,1,1,2-Tetrachloroethane	0.0250	0.0270	0.0271	108	109	74.0-124			0.587	20
1,1,2,2-Tetrachloroethane	0.0250	0.0253	0.0246	101	98.3	73.0-120			2.92	20
Tetrachloroethene	0.0250	0.0266	0.0270	106	108	70.0-127			1.47	20
Toluene	0.0250	0.0239	0.0238	95.7	95.3	77.0-120			0.404	20
1,1,2-Trichlorotrifluoroethane	0.0250	0.0226	0.0218	90.4	87.3	64.0-135			3.51	20
1,2,3-Trichlorobenzene	0.0250	0.0269	0.0257	108	103	68.0-126			4.52	20
1,2,4-Trichlorobenzene	0.0250	0.0288	0.0283	115	113	70.0-127			1.52	20
1,1,1-Trichloroethane	0.0250	0.0259	0.0260	104	104	69.0-125			0.148	20
1,1,2-Trichloroethane	0.0250	0.0242	0.0244	96.6	97.7	78.0-120			1.05	20
Trichloroethene	0.0250	0.0252	0.0250	101	99.8	79.0-120			1.08	20
Trichlorofluoromethane	0.0250	0.0233	0.0242	93.3	97.0	59.0-136			3.87	20
1,2,3-Trichloropropane	0.0250	0.0247	0.0243	98.8	97.4	73.0-124			1.42	20
1,2,3-Trimethylbenzene	0.0250	0.0261	0.0253	104	101	76.0-120			2.90	20
1,2,4-Trimethylbenzene	0.0250	0.0266	0.0258	106	103	75.0-120			2.88	20
1,3,5-Trimethylbenzene	0.0250	0.0260	0.0255	104	102	75.0-120			1.66	20
Vinyl chloride	0.0250	0.0228	0.0243	91.3	97.1	63.0-134			6.13	20
Xylenes, Total	0.0750	0.0777	0.0784	104	105	77.0-120			0.897	20
(S) Toluene-d8				*99.1*	*99.0*	*80.0-120*				
(S) Dibromofluoromethane				*97.1*	*98.8*	*74.0-131*				
(S) 4-Bromofluorobenzene				*97.7*	*97.3*	*64.0-132*				

Method Blank (MB)

(MB) R3284470-3 02/06/18 11:51

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Ethylbenzene	U		0.000297	0.00100
Tetrachloroethene	U		0.000276	0.00100
Xylenes, Total	U		0.000698	0.00300
(S) Toluene-d8	*103*			*80.0-120*
(S) Dibromofluoromethane	*104*			*74.0-131*
(S) 4-Bromofluorobenzene	*103*			*64.0-132*

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3284470-1 02/06/18 10:06 • (LCSD) R3284470-2 02/06/18 10:27

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Ethylbenzene	0.0250	0.0234	0.0241	93.4	96.3	77.0-120			3.05	20
Tetrachloroethene	0.0250	0.0229	0.0235	91.4	94.0	70.0-127			2.82	20
Xylenes, Total	0.0750	0.0708	0.0718	94.4	95.7	77.0-120			1.40	20
(S) Toluene-d8				*98.8*	*101*	*80.0-120*				
(S) Dibromofluoromethane				*107*	*103*	*74.0-131*				
(S) 4-Bromofluorobenzene				*100*	*101*	*64.0-132*				

Method Blank (MB)

(MB) R3283201-1 01/31/18 19:11

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Extractable Petroleum Hydrocarbon	U		1.05	4.00
(S) o-Terphenyl	*89.5*			*18.0-148*

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3283201-2 01/31/18 19:25 • (LCSD) R3283201-3 01/31/18 19:39

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Extractable Petroleum Hydrocarbon	60.0	46.9	47.9	78.2	79.8	50.0-150			2.10	20
(S) o-Terphenyl				*101*	*96.8*	*18.0-148*				

L966581-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L966581-02 01/31/18 19:52 • (MS) R3283201-4 01/31/18 20:06 • (MSD) R3283201-5 01/31/18 20:20

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Extractable Petroleum Hydrocarbon	60.0	ND	50.8	49.8	79.2	77.4	1	50.0-150			2.12	20
(S) o-Terphenyl					*73.2*	*85.4*		*18.0-148*				

Method Blank (MB)

(MB) R3283841-3 02/02/18 20:21

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Acenaphthene	U		0.00642	0.0330
Acenaphthylene	U		0.00671	0.0330
Anthracene	U		0.00632	0.0330
Benzidine	U		0.0637	0.333
Benzo(a)anthracene	U		0.00428	0.0330
Benzo(b)fluoranthene	U		0.00695	0.0330
Benzo(k)fluoranthene	U		0.00582	0.0330
Benzo(g,h,i)perylene	U		0.00721	0.0330
Benzo(a)pyrene	U		0.00548	0.0330
Bis(2-chlorethoxy)methane	U		0.00770	0.333
Bis(2-chloroethyl)ether	U		0.00896	0.333
Bis(2-chloroisopropyl)ether	U		0.00760	0.333
4-Bromophenyl-phenylether	U		0.0114	0.333
2-Chloronaphthalene	U		0.00639	0.0330
4-Chlorophenyl-phenylether	U		0.00627	0.333
Chrysene	U		0.00555	0.0330
Dibenz(a,h)anthracene	U		0.00821	0.0330
3,3-Dichlorobenzidine	U		0.0794	0.333
2,4-Dinitrotoluene	U		0.00607	0.333
2,6-Dinitrotoluene	U		0.00737	0.333
Fluoranthene	U		0.00496	0.0330
Fluorene	U		0.00682	0.0330
Hexachlorobenzene	U		0.00856	0.333
Hexachloro-1,3-butadiene	U		0.0100	0.333
Hexachlorocyclopentadiene	U		0.0587	0.333
Hexachloroethane	U		0.0134	0.333
Indeno(1,2,3-cd)pyrene	U		0.00772	0.0330
Isophorone	U		0.00522	0.333
2-Methylnaphthalene	U		0.00861	0.0330
Naphthalene	U		0.00889	0.0330
Nitrobenzene	U		0.00695	0.333
n-Nitrosodimethylamine	U		0.0647	0.333
n-Nitrosodiphenylamine	U		0.00594	0.333
n-Nitrosodi-n-propylamine	U		0.00906	0.333
Phenanthrene	U		0.00528	0.0330
Benzylbutyl phthalate	U		0.0103	0.333
Bis(2-ethylhexyl)phthalate	U		0.0120	0.333
Di-n-butyl phthalate	U		0.0109	0.333
Diethyl phthalate	U		0.00691	0.333
Dimethyl phthalate	U		0.00540	0.333

Method Blank (MB)

(MB) R3283841-3 02/02/18 20:21

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Di-n-octyl phthalate	U		0.00907	0.333
Pyrene	U		0.0123	0.0330
1,2,4-Trichlorobenzene	U		0.00876	0.333
4-Chloro-3-methylphenol	U		0.00477	0.333
2-Chlorophenol	U		0.00831	0.333
2,4-Dichlorophenol	U		0.00746	0.333
2,4-Dimethylphenol	U		0.0471	0.333
4,6-Dinitro-2-methylphenol	U		0.124	0.333
2,4-Dinitrophenol	U		0.0980	0.333
2-Nitrophenol	U		0.0130	0.333
4-Nitrophenol	U		0.0525	0.333
Pentachlorophenol	U		0.0480	0.333
Phenol	U		0.00695	0.333
2,4,6-Trichlorophenol	U		0.00779	0.333
(S) Nitrobenzene-d5	*57.6*			*18.0-125*
(S) 2-Fluorobiphenyl	*62.6*			*28.0-120*
(S) p-Terphenyl-d14	*64.0*			*13.0-131*
(S) Phenol-d5	*56.8*			*20.0-120*
(S) 2-Fluorophenol	*61.0*			*20.0-120*
(S) 2,4,6-Tribromophenol	*57.7*			*17.0-137*

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3283841-1 02/02/18 19:34 • (LCSD) R3283841-2 02/02/18 19:57

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Acenaphthene	0.667	0.471	0.491	70.6	73.6	47.0-120			4.13	21
Acenaphthylene	0.667	0.472	0.496	70.8	74.4	48.0-120			4.94	21
Anthracene	0.667	0.440	0.461	65.9	69.1	46.0-120			4.68	20
Benzidine	0.667	ND	ND	0.000	0.000	1.00-120	J4	J4	0.000	36
Benzo(a)anthracene	0.667	0.518	0.566	77.6	84.9	46.0-120			8.93	20
Benzo(b)fluoranthene	0.667	0.533	0.588	80.0	88.2	45.0-120			9.82	22
Benzo(k)fluoranthene	0.667	0.509	0.508	76.2	76.2	45.0-120			0.0860	23
Benzo(g,h,i)perylene	0.667	0.571	0.601	85.6	90.2	48.0-120			5.25	21
Benzo(a)pyrene	0.667	0.517	0.547	77.5	82.0	46.0-120			5.62	21
Bis(2-chlorethoxy)methane	0.667	0.329	0.349	49.3	52.4	41.0-120			5.97	22
Bis(2-chloroethyl)ether	0.667	0.375	0.401	56.3	60.0	28.0-120			6.51	28
Bis(2-chloroisopropyl)ether	0.667	0.418	0.420	62.7	63.0	40.0-120			0.494	27
4-Bromophenyl-phenylether	0.667	0.457	0.466	68.5	69.9	45.0-120			1.92	20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3283841-1 02/02/18 19:34 • (LCSD) R3283841-2 02/02/18 19:57

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
2-Chloronaphthalene	0.667	0.450	0.479	67.5	71.8	43.0-120			6.21	22
4-Chlorophenyl-phenylether	0.667	0.485	0.499	72.7	74.7	46.0-120			2.80	21
Chrysene	0.667	0.512	0.550	76.8	82.5	46.0-120			7.15	20
Dibenz(a,h)anthracene	0.667	0.550	0.582	82.5	87.2	47.0-120			5.54	22
3,3-Dichlorobenzidine	0.667	0.429	0.449	64.3	67.3	20.0-130			4.64	24
2,4-Dinitrotoluene	0.667	0.520	0.534	78.0	80.0	48.0-122			2.57	21
2,6-Dinitrotoluene	0.667	0.484	0.500	72.6	74.9	46.0-120			3.08	21
Fluoranthene	0.667	0.483	0.514	72.4	77.0	46.0-120			6.11	20
Fluorene	0.667	0.482	0.499	72.2	74.8	47.0-120			3.43	20
Hexachlorobenzene	0.667	0.486	0.509	72.9	76.4	42.0-120			4.65	20
Hexachloro-1,3-butadiene	0.667	0.431	0.429	64.6	64.3	36.0-120			0.529	26
Hexachlorocyclopentadiene	0.667	0.473	0.496	70.9	74.4	20.0-124			4.88	26
Hexachloroethane	0.667	0.414	0.428	62.0	64.2	32.0-120			3.53	31
Indeno(1,2,3-cd)pyrene	0.667	0.575	0.604	86.3	90.5	48.0-120			4.81	21
Isophorone	0.667	0.336	0.355	50.3	53.2	42.0-120			5.52	21
2-Methylnaphthalene	0.667	0.368	0.381	55.2	57.1	43.0-120			3.42	22
Naphthalene	0.667	0.372	0.391	55.8	58.6	41.0-120			4.82	24
Nitrobenzene	0.667	0.362	0.385	54.3	57.7	36.0-120			6.22	24
n-Nitrosodimethylamine	0.667	0.342	0.366	51.2	54.9	20.0-120			6.88	31
n-Nitrosodiphenylamine	0.667	0.443	0.458	66.5	68.7	42.0-120			3.31	20
n-Nitrosodi-n-propylamine	0.667	0.392	0.417	58.8	62.6	39.0-120			6.27	23
Phenanthrene	0.667	0.466	0.496	69.8	74.3	45.0-120			6.23	20
Benzylbutyl phthalate	0.667	0.476	0.531	71.3	79.5	41.0-123			10.9	20
Bis(2-ethylhexyl)phthalate	0.667	0.496	0.535	74.4	80.2	41.0-124			7.45	20
Di-n-butyl phthalate	0.667	0.456	0.497	68.4	74.5	44.0-120			8.49	20
Diethyl phthalate	0.667	0.489	0.508	73.3	76.1	46.0-120			3.79	20
Dimethyl phthalate	0.667	0.476	0.489	71.4	73.3	47.0-120			2.69	21
Di-n-octyl phthalate	0.667	0.496	0.534	74.3	80.0	40.0-123			7.33	21
Pyrene	0.667	0.487	0.532	73.0	79.8	45.0-120			8.88	21
1,2,4-Trichlorobenzene	0.667	0.393	0.403	58.9	60.5	40.0-120			2.69	25
4-Chloro-3-methylphenol	0.667	0.375	0.389	56.2	58.4	46.0-120			3.82	20
2-Chlorophenol	0.667	0.456	0.471	68.3	70.6	37.0-120			3.30	27
2,4-Dichlorophenol	0.667	0.385	0.400	57.7	60.0	45.0-120			3.98	21
2,4-Dimethylphenol	0.667	0.330	0.345	49.5	51.8	40.0-120			4.41	22
4,6-Dinitro-2-methylphenol	0.667	0.435	0.467	65.3	70.0	34.0-120			6.93	23
2,4-Dinitrophenol	0.667	0.297	0.313	44.5	47.0	10.0-120			5.37	30
2-Nitrophenol	0.667	0.396	0.410	59.3	61.5	42.0-120			3.56	24
4-Nitrophenol	0.667	0.380	0.297	57.0	44.5	40.0-120		J3	24.5	21
Pentachlorophenol	0.667	0.467	0.499	70.0	74.8	33.0-122			6.64	22
Phenol	0.667	0.418	0.441	62.7	66.0	38.0-120			5.17	25

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3283841-1 02/02/18 19:34 • (LCSD) R3283841-2 02/02/18 19:57

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
2,4,6-Trichlorophenol	0.667	0.443	0.464	66.4	69.6	47.0-120			4.61	22
(S) Nitrobenzene-d5				*53.3*	*58.7*	*18.0-125*				
(S) 2-Fluorobiphenyl				*68.5*	*71.6*	*28.0-120*				
(S) p-Terphenyl-d14				*61.6*	*67.2*	*13.0-131*				
(S) Phenol-d5				*63.1*	*66.9*	*20.0-120*				
(S) 2-Fluorophenol				*69.9*	*73.3*	*20.0-120*				
(S) 2,4,6-Tribromophenol				*73.4*	*74.2*	*17.0-137*				

L966693-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L966693-02 02/02/18 23:49 • (MS) R3283841-4 02/03/18 00:13 • (MSD) R3283841-5 02/03/18 00:36

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Acenaphthene	0.667	ND	0.432	0.416	64.8	62.4	1	37.0-120			3.78	23
Acenaphthylene	0.667	ND	0.431	0.420	64.6	63.0	1	41.0-120			2.50	22
Anthracene	0.667	ND	0.388	0.380	58.2	56.9	1	30.0-123			2.23	25
Benzidine	0.667	ND	ND	ND	0.000	0.000	1	1.00-120	J6	J6	0.000	36
Benzo(a)anthracene	0.667	ND	0.454	0.446	68.1	66.8	1	21.0-123			1.86	26
Benzo(b)fluoranthene	0.667	ND	0.464	0.403	69.5	60.4	1	20.0-127			14.0	29
Benzo(k)fluoranthene	0.667	ND	0.428	0.485	64.2	72.8	1	22.0-123			12.5	28
Benzo(g,h,i)perylene	0.667	ND	0.490	0.494	73.4	74.1	1	10.0-120			0.904	32
Benzo(a)pyrene	0.667	ND	0.444	0.441	66.5	66.1	1	23.0-120			0.724	27
Bis(2-chlorethoxy)methane	0.667	ND	0.362	0.342	54.2	51.2	1	37.0-120			5.66	22
Bis(2-chloroethyl)ether	0.667	ND	0.350	0.333	52.5	49.9	1	26.0-120			4.95	27
Bis(2-chloroisopropyl)ether	0.667	ND	0.373	0.362	56.0	54.3	1	35.0-120			3.01	25
4-Bromophenyl-phenylether	0.667	ND	0.399	0.398	59.8	59.7	1	34.0-120			0.261	23
2-Chloronaphthalene	0.667	ND	0.412	0.406	61.8	60.8	1	40.0-120			1.54	22
4-Chlorophenyl-phenylether	0.667	ND	0.436	0.429	65.3	64.3	1	37.0-120			1.54	23
Chrysene	0.667	ND	0.444	0.438	66.5	65.6	1	19.0-127			1.31	27
Dibenz(a,h)anthracene	0.667	ND	0.479	0.482	71.8	72.3	1	10.0-120			0.733	28
3,3-Dichlorobenzidine	0.667	ND	0.296	0.305	44.4	45.7	1	10.0-142			3.04	30
2,4-Dinitrotoluene	0.667	ND	0.464	0.441	69.6	66.1	1	37.0-129			5.14	24
2,6-Dinitrotoluene	0.667	ND	0.430	0.420	64.5	62.9	1	40.0-120			2.47	23
Fluoranthene	0.667	ND	0.428	0.419	64.1	62.8	1	20.0-133			2.05	28
Fluorene	0.667	ND	0.431	0.425	64.6	63.7	1	35.0-120			1.40	23
Hexachlorobenzene	0.667	ND	0.437	0.429	65.4	64.3	1	33.0-120			1.73	24
Hexachloro-1,3-butadiene	0.667	ND	0.460	0.448	69.0	67.1	1	33.0-120			2.79	25
Hexachlorocyclopentadiene	0.667	ND	0.385	0.361	57.7	54.1	1	10.0-120			6.59	33
Hexachloroethane	0.667	ND	0.373	0.359	56.0	53.9	1	21.0-120			3.84	30

L966693-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L966693-02 02/02/18 23:49 • (MS) R3283841-4 02/03/18 00:13 • (MSD) R3283841-5 02/03/18 00:36

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Indeno(1,2,3-cd)pyrene	0.667	ND	0.496	0.501	74.4	75.1	1	10.0-120			0.979	30
Isophorone	0.667	ND	0.371	0.353	55.6	52.9	1	38.0-120			4.95	22
2-Methylnaphthalene	0.667	ND	0.402	0.392	60.3	58.7	1	35.0-120			2.68	23
Naphthalene	0.667	ND	0.416	0.403	62.3	60.5	1	37.0-120			2.98	25
Nitrobenzene	0.667	ND	0.399	0.373	59.8	56.0	1	32.0-120			6.67	24
n-Nitrosodimethylamine	0.667	ND	0.308	0.288	46.2	43.2	1	18.0-120			6.71	27
n-Nitrosodiphenylamine	0.667	ND	0.366	0.357	54.8	53.6	1	20.0-125			2.27	25
n-Nitrosodi-n-propylamine	0.667	ND	0.366	0.352	54.9	52.8	1	34.0-120			3.95	23
Phenanthrene	0.667	ND	0.417	0.407	62.5	61.0	1	24.0-124			2.36	25
Benzylbutyl phthalate	0.667	ND	0.419	0.405	62.9	60.7	1	18.0-130			3.58	27
Bis(2-ethylhexyl)phthalate	0.667	ND	0.436	0.420	63.4	61.1	1	19.0-127			3.65	28
Di-n-butyl phthalate	0.667	ND	0.403	0.391	60.5	58.6	1	29.0-120			3.12	26
Diethyl phthalate	0.667	ND	0.437	0.417	65.5	62.6	1	42.0-121			4.60	23
Dimethyl phthalate	0.667	ND	0.415	0.410	62.2	61.5	1	42.0-120			1.07	23
Di-n-octyl phthalate	0.667	ND	0.430	0.418	64.5	62.7	1	21.0-122			2.84	27
Pyrene	0.667	ND	0.424	0.415	63.5	62.2	1	19.0-127			2.07	29
1,2,4-Trichlorobenzene	0.667	ND	0.427	0.417	64.1	62.4	1	39.0-120			2.54	25
4-Chloro-3-methylphenol	0.667	ND	0.400	0.381	59.9	57.2	1	37.0-121			4.74	23
2-Chlorophenol	0.667	ND	0.414	0.397	62.1	59.6	1	34.0-120			4.09	25
2,4-Dichlorophenol	0.667	ND	0.417	0.405	62.5	60.7	1	41.0-120			2.80	22
2,4-Dimethylphenol	0.667	ND	0.345	0.330	51.7	49.4	1	27.0-120			4.51	25
4,6-Dinitro-2-methylphenol	0.667	ND	0.433	0.377	64.9	56.5	1	10.0-131			13.8	29
2,4-Dinitrophenol	0.667	ND	0.372	0.296	55.8	44.4	1	10.0-142			22.7	30
2-Nitrophenol	0.667	ND	0.457	0.437	68.5	65.5	1	34.0-124			4.41	27
4-Nitrophenol	0.667	ND	1.31	1.33	197	199	1	26.0-133	J5	J5	1.14	25
Pentachlorophenol	0.667	ND	0.439	0.435	65.8	65.1	1	15.0-152			0.939	26
Phenol	0.667	ND	0.362	0.357	54.2	53.6	1	33.0-120			1.22	24
2,4,6-Trichlorophenol	0.667	ND	0.381	0.378	57.2	56.6	1	40.0-125			0.930	24
(S) Nitrobenzene-d5					*59.3*	*54.9*		*18.0-125*				
(S) 2-Fluorobiphenyl					*61.4*	*60.0*		*28.0-120*				
(S) p-Terphenyl-d14					*53.0*	*52.3*		*13.0-131*				
(S) Phenol-d5					*56.5*	*54.5*		*20.0-120*				
(S) 2-Fluorophenol					*62.9*	*59.3*		*20.0-120*				
(S) 2,4,6-Tribromophenol					*64.2*	*63.8*		*17.0-137*				

Guide to Reading and Understanding Your Laboratory Report

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Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state “ND” (Not Detected) or “BDL” (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
J1	Surrogate recovery limits have been exceeded; values are outside upper control limits.
J3	The associated batch QC was outside the established quality control range for precision.
J4	The associated batch QC was outside the established quality control range for accuracy.
J5	The sample matrix interfered with the ability to make any accurate determination; spike value is high.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.

ESC Lab Sciences is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.
* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

State Accreditations

Alabama	40660	Nevada	TN-03-2002-34
Alaska	UST-080	New Hampshire	2975
Arizona	AZ0612	New Jersey–NELAP	TN002
Arkansas	88-0469	New Mexico	TN00003
California	01157CA	New York	11742
Colorado	TN00003	North Carolina	Env375
Connecticut	PH-0197	North Carolina [1]	DW21704
Florida	E87487	North Carolina [2]	41
Georgia	NELAP	North Dakota	R-140
Georgia [1]	923	Ohio–VAP	CL0069
Idaho	TN00003	Oklahoma	9915
Illinois	200008	Oregon	TN200002
Indiana	C-TN-01	Pennsylvania	68-02979
Iowa	364	Rhode Island	221
Kansas	E-10277	South Carolina	84004
Kentucky [1]	90010	South Dakota	n/a
Kentucky [2]	16	Tennessee [1 4]	2006
Louisiana	AI30792	Texas	T 104704245-07-TX
Maine	TN0002	Texas [5]	LAB0152
Maryland	324	Utah	6157585858
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	109
Minnesota	047-999-395	Washington	C1915
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA
Nebraska	NE-OS-15-05		

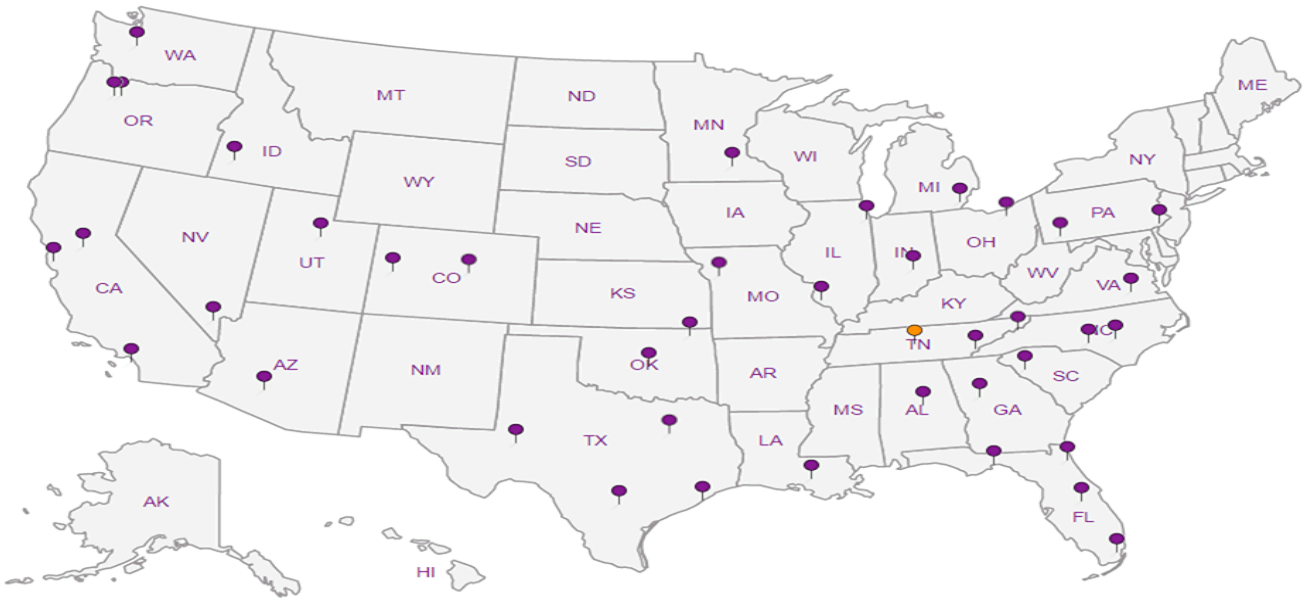
Third Party Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA-LAP,LLC	100789
A2LA – ISO 17025 [5]	1461.02	DOD	1461.01
Canada	1461.01	USDA	S-67674
EPA–Crypto	TN00003		

[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold n/a Accreditation not applicable

Our Locations

ESC Lab Sciences has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. ESC Lab Sciences performs all testing at our central laboratory.



S&ME Inc. - Knoxville

1413 Topside Rd
Louisville, TN 37777

Billing Information:
Accounts Payable
1413 Topside Rd
Louisville, TN 37777

Pres Chk

Report to: J. Rowe

Email To: JRowe@smeinc.com

Project Description: Sanitary Laundry

City/State Collected: Knoxville TN

Phone: 865-970-0003
Fax: 865-970-2312

Client Project #

Lab Project #

Collected by (print): Josh Rowe

Site/Facility ID #

P.O. #

Collected by (signature):

Immediately Packed on Ice N ___ Y X

Rush? (Lab MUST Be Notified)
___ Same Day 200%
___ Next Day 100%
___ Two Day 50%
___ Three Day 25%

Quote #

Date Results Needed 1/30/18

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	VOC	SVOC	EPH TN	Level IV Data Pkg	Rem./Contaminant	Sample # (lab only)
S1	G	SS	0-18"	~~1/29/18~~ 1/30/18	1300	2	X	X	X	X		61
S2	G	SS	0-18"	1/30/18	1330	2	X	X	X	X		62
S3	G	SS	0-18"	1/30/18	1400	2	X	X	X	X		63

Analysis / Container / Preservative

Chain of Custody Page ___ of ___

ESC LABORATORY SCIENCES
YOUR LAB OF CHOICE
12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

L# 946581
Tab G083
Acctnum: SME
Template:
Prelogin:
TSR: 690 - Tom Mellette
PB:
Shipped Via:

* Matrix:
SS - Soil AIR - Air
GW - Groundwater
WW - WasteWater
DW - Drinking Water
OT - Other ___

Remarks: ESCKN Level IV Data Pkg

pH ___ Temp ___
Flow ___ Other ___

Samples returned via: __ UPS __ FedEx __ Courier X Cor

Tracking #

Sample Receipt Checklist
COC Seal Present/Intact: NP Y N
COC Signed/Accurate: Y N
Bottles arrive intact: Y N
Correct bottles used: Y N
Sufficient volume sent: Y N
If Applicable
VOA Zero Headspace: Y N
Preservation Correct/Checked: Y N

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)
	1/30/18	1500	
Relinquished by : (Signature)	Date: 1-30-18	Time: 1700	Received by: (Signature)
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature) Maura Johnson

Trip Blank Received: Yes / No
HCL / MeoH
TBR

Temp: 1.3 °C Bottles Received: 6

Date: 01-31-18 Time: 0815

If preservation required by Login: Date/Time

Hold:

Condition: NCF / OK

ANALYTICAL REPORT

February 23, 2018

S&ME Inc. - Knoxville

Sample Delivery Group:	L970909
Samples Received:	01/31/2018
Project Number:	4143-17-017
Description:	Sanitary Laundary

Report To:

Josh Rowe
1413 Topside Rd
Louisville, TN 37777

Entire Report Reviewed By:

Tom Mellette
Technical Service Representative

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by ESC is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.

TABLE OF CONTENTS

S2 L970909-01 Waste

Collected by	Collected date/time	Received date/time
Josh Rowe	01/30/18 13:30	01/31/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Preparation by Method 1311	WG1075445	1	02/20/18 11:03	02/20/18 11:03	KK
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1075907	1	02/21/18 14:27	02/21/18 14:27	BMB

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All radiochemical sample results for solids are reported on a dry weight basis with the exception of tritium, carbon-14 and radon, unless wet weight was requested by the client. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Tom Mellette
Technical Service Representative

Preparation by Method 1311

Analyte	Result	Qualifier	Prep date / time	Batch
TCLP ZHE Extraction	-		2/20/2018 11:03:08 AM	WG1075445

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Limit mg/l	Dilution	Analysis date / time	Batch
Benzene	ND		0.0500	0.50	1	02/21/2018 14:27	WG1075907
Carbon tetrachloride	ND		0.0500	0.50	1	02/21/2018 14:27	WG1075907
Chlorobenzene	ND		0.0500	100	1	02/21/2018 14:27	WG1075907
Chloroform	ND		0.250	6	1	02/21/2018 14:27	WG1075907
1,2-Dichloroethane	ND		0.0500	0.50	1	02/21/2018 14:27	WG1075907
1,1-Dichloroethene	ND		0.0500	0.70	1	02/21/2018 14:27	WG1075907
2-Butanone (MEK)	ND		0.500	200	1	02/21/2018 14:27	WG1075907
Tetrachloroethene	0.0508		0.0500	0.70	1	02/21/2018 14:27	WG1075907
Trichloroethene	ND		0.0500	0.50	1	02/21/2018 14:27	WG1075907
Vinyl chloride	ND		0.0500	0.20	1	02/21/2018 14:27	WG1075907
(S) Toluene-d8	*104*		*80.0-120*	*120*		*02/21/2018 14:27*	WG1075907
(S) Dibromofluoromethane	*96.4*		*76.0-123*	*123*		*02/21/2018 14:27*	WG1075907
(S) a,a,a-Trifluorotoluene	*103*		*80.0-120*	*120*		*02/21/2018 14:27*	WG1075907
(S) 4-Bromofluorobenzene	*100*		*80.0-120*	*120*		*02/21/2018 14:27*	WG1075907

Method Blank (MB)

(MB) R3288063-3 02/21/18 14:07

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Benzene	U		0.0167	0.0500
Carbon tetrachloride	U		0.0167	0.0500
Chlorobenzene	U		0.0167	0.0500
Chloroform	U		0.0833	0.250
1,2-Dichloroethane	U		0.0167	0.0500
1,1-Dichloroethene	U		0.0167	0.0500
2-Butanone (MEK)	U		0.167	0.500
Tetrachloroethene	U		0.0167	0.0500
Trichloroethene	U		0.0167	0.0500
Vinyl chloride	U		0.0167	0.0500
(S) Toluene-d8	*99.3*			*80.0-120*
(S) Dibromofluoromethane	*96.0*			*76.0-123*
(S) a,a,a-Trifluorotoluene	*105*			*80.0-120*
(S) 4-Bromofluorobenzene	*97.5*			*80.0-120*

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3288063-1 02/21/18 11:46 • (LCSD) R3288063-2 02/21/18 12:06

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Benzene	0.0250	0.0210	0.0216	84.2	86.3	69.0-123			2.47	20
Carbon tetrachloride	0.0250	0.0250	0.0248	100	99.2	63.0-122			0.949	20
Chlorobenzene	0.0250	0.0263	0.0267	105	107	79.0-121			1.46	20
Chloroform	0.0250	0.0242	0.0240	96.7	96.0	72.0-121			0.675	20
1,2-Dichloroethane	0.0250	0.0252	0.0256	101	102	67.0-126			1.67	20
1,1-Dichloroethene	0.0250	0.0247	0.0243	98.7	97.2	64.0-129			1.47	20
2-Butanone (MEK)	0.125	0.117	0.122	93.2	97.9	37.0-158			4.90	20
Tetrachloroethene	0.0250	0.0279	0.0275	112	110	70.0-127			1.46	20
Trichloroethene	0.0250	0.0224	0.0223	89.7	89.2	78.0-120			0.491	20
Vinyl chloride	0.0250	0.0249	0.0247	99.6	98.9	64.0-133			0.755	20
(S) Toluene-d8				*104*	*105*	*80.0-120*				
(S) Dibromofluoromethane				*95.5*	*96.3*	*76.0-123*				
(S) a,a,a-Trifluorotoluene				*108*	*103*	*80.0-120*				
(S) 4-Bromofluorobenzene				*101*	*99.7*	*80.0-120*				

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Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state “ND” (Not Detected) or “BDL” (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description

The remainder of this page intentionally left blank, there are no qualifiers applied to this SDG.

ESC Lab Sciences is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.
* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

State Accreditations

Alabama	40660	Nevada	TN-03-2002-34
Alaska	UST-080	New Hampshire	2975
Arizona	AZ0612	New Jersey–NELAP	TN002
Arkansas	88-0469	New Mexico	TN00003
California	01157CA	New York	11742
Colorado	TN00003	North Carolina	Env375
Connecticut	PH-0197	North Carolina [1]	DW21704
Florida	E87487	North Carolina [2]	41
Georgia	NELAP	North Dakota	R-140
Georgia [1]	923	Ohio–VAP	CL0069
Idaho	TN00003	Oklahoma	9915
Illinois	200008	Oregon	TN200002
Indiana	C-TN-01	Pennsylvania	68-02979
Iowa	364	Rhode Island	221
Kansas	E-10277	South Carolina	84004
Kentucky [1]	90010	South Dakota	n/a
Kentucky [2]	16	Tennessee [1 4]	2006
Louisiana	AI30792	Texas	T 104704245-07-TX
Maine	TN0002	Texas [5]	LAB0152
Maryland	324	Utah	6157585858
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	109
Minnesota	047-999-395	Washington	C1915
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA
Nebraska	NE-OS-15-05		

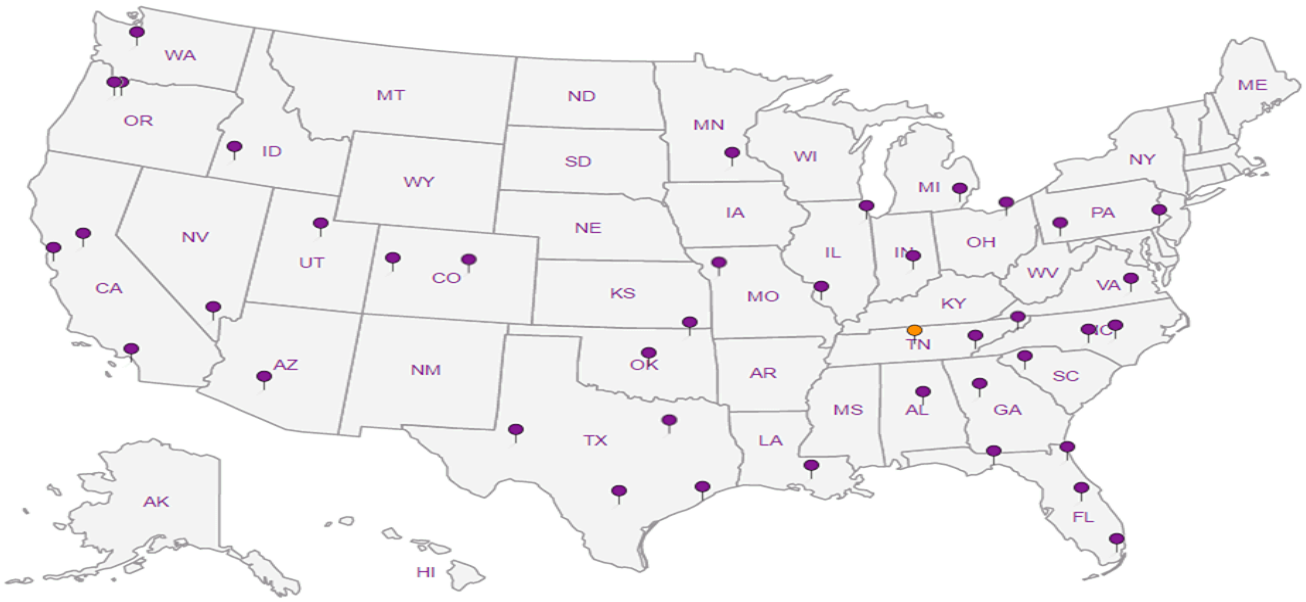
Third Party Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA-LAP,LLC	100789
A2LA – ISO 17025 [5]	1461.02	DOD	1461.01
Canada	1461.01	USDA	S-67674
EPA–Crypto	TN00003		

[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold n/a Accreditation not applicable

Our Locations

ESC Lab Sciences has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. ESC Lab Sciences performs all testing at our central laboratory.



S&ME Inc. - Knoxville

1413 Topside Rd
Louisville, TN 37777

Billing Information:
Accounts Payable
1413 Topside Rd
Louisville, TN 37777

Report to: J. Rowe

Email To: JRowe@smeinc.com

Project Description: Sanitary Laundry

City/State Collected: Knoxville TN

Phone: 865-970-0003
Fax: 865-970-2312

Client Project #

Lab Project #

Collected by (print): Josh Rowe

Site/Facility ID #

P.O. #

Collected by (signature):

Rush? (Lab MUST Be Notified)
___ Same Day 200%
___ Next Day 100%
___ Two Day 50%
___ Three Day 25%

Quote #

Date Results Needed: 1/3/18

Immediately Packed on Ice N___ Y X

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	VOC	SVOC	EPH TN	Level IV Data Pkg										Item/Contaminant	Sample # (lab only)
S1	G	SS	0-18"	~~1/24/17~~	1300	2	X	X	X	X											61
S2	G	SS	0-18"	1/30/18	1330	2	X	X	X	X											~~62~~
S3	G	SS	0-18"	1/30/18	1400	2	X	X	X	X											~~63~~

Analysis / Container / Preservative

Chain of Custody Page ___ of ___

ESC LABS SCIENCES
YOUR LAB OF CHOICE
12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

L# ~~941584~~ N 2/16/18
Tab G083 L970909
Acctnum: SME
Template:
Prelogin:
TSR: 690 - Tom Mellette
PB:
Shipped Via:

* Matrix:
SS - Soil AIR - Air
GW - Groundwater
WW - WasteWater
DW - Drinking Water
OT - Other

Remarks: ESCKN Level IV Data Pkg

pH ___ Temp ___
Flow ___ Other ___

Samples returned via: __UPS __FedEx __Courier XCOL Tracking #

Sample Receipt Checklist
COC Seal Present/Intact: NP Y N
COC Signed/Accurate: Y N
Bottles arrive intact: Y N
Correct bottles used: Y N
Sufficient volume sent: Y N
If Applicable
VOA Zero Headspace: Y N
Preservation Correct/Checked: Y N

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)
	1/30/18	1500	
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)
	1-30-18	1700	
Relinquished by: (Signature)	Date:	Time:	Received for lab by: (Signature)
			Maria Tahir

Trip Blank Received: Yes / No (HCL / MeoH / TBR)

Temp: 1.3c °C Bottles Received: 6

Date: 01-31-18 Time: 0848

If preservation required by Login: Date/Time

Hold:

Condition: NCF / OK

Andy Vann

From: Tom Mellette
Sent: Friday, February 16, 2018 1:16 PM
To: Login
Subject: RELOG L966581-02

Log for TCLP VOC's on STD TAT – no QC4 needed.

From: Rick Bruce [mailto:RBruce@smeinc.com]
Sent: Friday, February 16, 2018 12:09 PM
To: Liz Porter; Tom Mellette
Cc: Nate Peterson
Subject: RE: TCLP Analysis

This is fine.

James R. Bruce, PG, CHMM
Senior Geologist/Senior Project Manager

From: Liz Porter
Sent: Friday, February 16, 2018 1:08 PM
To: Tom Mellette <TMellette@esclabsciences.com>; Rick Bruce <RBruce@smeinc.com>
Cc: Nate Peterson <NPeterson@smeinc.com>
Subject: Re: TCLP Analysis

Tom,let's go ahead with the sample. I don't think we will need Level 4 on this since we are just using it for disposal characterization purposes, rather than for site assessment. Rick, does that sound like a reasonable interpretation?

Sent from my iPhone

On Feb 16, 2018, at 11:25 AM, Tom Mellette <TMellette@esclabsciences.com> wrote:

> Will be no problem – You want me to light the fuse ? If yes QC4 also on this one, QC4 on TCLP analysis is not common.
>
> **<image001.png>** Tom Mellette
>
> ---
>
> **From:** Liz Porter [mailto:LPorter@smeinc.com]
> **Sent:** Friday, February 16, 2018 9:54 AM
> **To:** Tom Mellette
> **Cc:** Nate Peterson; Rick Bruce
> **Subject:** TCLP Analysis

Hi Tom – would it be possible to run a TCLP analysis for tetrachloroethene on Sample S-2 from L966581? If necessary, we can collect another sample from this drum. Just let me know –

Thank you!

Liz Porter, PG, PMP
Senior Project Manager/Vice President

Appendix III – Draft Brownfield Agreement

STATE OF TENNESSEE

DEPARTMENT OF ENVIRONMENT AND CONSERVATION

DIVISION OF REMEDIATION

BROWNFIELD VOLUNTARY AGREEMENT

RE: Sanitary Laundry – 625 Broadway, Knoxville

SITE NUMBER: 47-545

INTRODUCTION

This Brownfield Voluntary Agreement (hereinafter "AGREEMENT") is made and entered into as of _____, 201_, by and between[among] the Tennessee Department of Environment and Conservation (hereinafter "Department"), and _____ , a _____ **[e.g., organized under and existing pursuant to the laws of the State of Tennessee]** (hereinafter [collectively] "Voluntary Party") for the purpose of addressing a 0.4 acre portion of the above-referenced site (hereinafter "Site"), which has the real or perceived threat of the presence on the Site of hazardous substances, solid waste, or any other pollutant.

_____ is the duly appointed Commissioner of the Department. _____, Director of the Department's Remediation Division, has been delegated the authority to enter into these Agreements.

Pursuant to Tennessee Code Annotated § 68-212-224, the Commissioner is authorized to enter into an Agreement with a party who is willing and able to conduct an investigation and remediation of a hazardous substance site or Brownfields Project and who did not generate, transport or release the contamination that is to be addressed at the Site.

REQUIREMENTS

A. SITE LOCATION

The Site is located at 625 Broadway, Knoxville, Knox County, Tennessee and is shown in Exhibit A. The Site is approximately 0.4 acres in size and has a Knox County Parcel

Identification of Parcel 094DP013. A legal description of this tract is contained in Deed Book _____ Page _____ and is attached hereto as Exhibit B.

B. ELIGIBILITY

As required by T.C.A. § 68-212-224, a summary description of all known existing environmental investigations, studies, reports or documents concerning the Site's environmental condition has been submitted to the Department by the Voluntary Party.(A copy of the Summary is attached hereto as Exhibit C). On the date of entering into this AGREEMENT, the Department has determined that the Site is not listed or been proposed for listing on the federal National Priorities List by the United States Environmental Protection Agency (EPA). By entering into this AGREEMENT, the Voluntary Party certifies to the best of the Voluntary Party's knowledge that the Voluntary Party did not generate, transport or release contamination that is to be addressed at this site.

A. FINANCIAL REQUIREMENTS

Tennessee Code Annotated § 68-212-224 requires consideration of a fee to enroll in the Voluntary Cleanup Oversight and Assistance Program. The Commissioner has determined that a fee of three thousand dollars ($ 3,000.00) DOLLARS is appropriate for the Site. This payment must accompany this AGREEMENT when it is signed on behalf of the Voluntary Party and returned to the Department. The Commissioner has set the following schedule of additional fees that apply to all sites working in cooperation with the Department to recover the expense of oversight. These fees are in place of hourly time charges and normal travel costs during the first 150 hours of oversight for the project.

Program Entry	$ 750
Site Characterization	$ 2,000
Remediation	$ 2,500
Risk Assessment	$ 2,000
Site Specific Ground Water Classification	$ 2,000
Remedy Requirement Institutional Controls	$ 500
Annual O&M Review	$ 500

In addition to the fees identified previously, an annual longevity fee of $3,000 will be charged to the Site on the anniversary of the date the site entered the program until a letter requiring no further action has been issued or this AGREEMENT has been terminated.

Upon reaching 150 hours of oversight, the Site will be charged the current hourly rate (e.g. seventy-five dollars ($75.00) per hour for FY 2009-2010) per hour of oversight in addition to the fee schedule listed above. This amount includes the current hourly rate and pro rata portion of benefits for the Department's employees actively employed in oversight of work under this AGREEMENT, including preparation for and attendance at meetings, mileage, and the current State overhead rate. Additionally, any out-of-pocket expense, mileage, lab expense and costs including the State's current overhead rate, costs billed by State contractor(s) who are actively performing oversight or other unusual costs to the Department shall be billed to and paid by the Voluntary Party.

Fees must be paid to remain in the Voluntary Cleanup Oversight and Assistance Program and to receive a letter of no further action under Section H of this AGREEMENT.

D. IDENTIFICATION AND DOCUMENTATION OF CLEANUP

Based on the information submitted to the Department by or behalf of the Voluntary Party, and the Department's own review and investigation of the Site, the Parties hereto agree that the following environmental conditions are to be addressed under this AGREEMENT:

Sanitary Laundry and Dry Cleaning Company operated a dry cleaning facility at the site for approximately 60 years in the 1900's. During this time, petroleum products and dry cleaning fluids were stored in aboveground storage tanks, underground storage tanks, and drums. These materials were actively used for dry cleaning, laundry, and delivery vehicle fuel supply during the time of operation.

Investigation in 1993 indicated surface soil and groundwater on the Site were contaminated with hazardous substances including, but not limited to, petroleum hydrocarbons and chlorinated solvents. Impacts were the result of leaks from storage tanks and drums, as well

as, spills resulting from improper material handling. Two underground storage tanks used for petroleum products were subsequently removed in 1993.

The Site was added to the List of Inactive Hazardous Substance Sites by action of the Tennessee Solid Waste Disposal Control Board in 1994 and became Site #47-545, Sanitary Laundry and Dry Cleaners. TDEC initiated an emergency removal action in 1994 that containerized and disposed of the contents of an underground storage tank and two barrels of dry cleaning fluid, one of which was leaking. The underground storage tank contained fluid primarily consisting of water with trace levels of benzene, trichloroethene, and other hydrocarbons. A Notice of a Hazardous Substance Site was filed with the Knox County Register's Office on the Site in 1997. An Imminent, Substantial Danger Memorandum was issued by the Commissioner in 1999 due to the presence of multiple fifty-five (55) gallon drums of hazardous substances on the site. Access at the time was uncontrolled and there existed the potential for explosion and/or fire. TDEC initiated an emergency removal of the drums in October 1999.

The City of Knoxville, through an EPA Brownfields Assessment Grant (BF-95443509-1) completed additional investigation of the Site. The results of this study show there to be a continued presence of hazardous substances in the groundwater, soil, and air that include, but are not limited to, petroleum hydrocarbons and chlorinated solvents. Tetrachloroethylene and trichloroethylene were observed in the soil gas below the building with a maximum concentration of 68,000 $\mu g/m^3$ and 10,000 $\mu g/m^3$, respectively. These constituents also exceeded the EPA Regional Screening Levels for industrial facilities in the ambient air within the structure; a maximum concentration of tetrachloroethylene in ambient air was observed at 46 $\mu g/m^3$ and trichloroethylene at 6.4 $\mu g/m^3$.

E. AGREED LIABILITY RELIEF

T.C.A. § 68-212-224(a)(5) provides that, TDEC is authorized to limit the liability of a participant in a voluntary agreement or consent order entered into pursuant to T.C.A. § 68-212224. Such voluntary agreement or consent order may limit the liability of such participant to the obligations set forth therein and exempt the participant from any further liability under any

statute administered by TDEC for investigation, remediation, monitoring, and/or maintenance of contamination identified and addressed in the voluntary agreement or consent order. TDEC may extend this liability protection to successors in interest or in title to the participant, contractors conducting response actions at the Site, developers, future owners, tenants, and lenders, fiduciaries or insurers (collectively "Successor Parties").

In accordance with the above referenced authority, TDEC agrees that other than with respect to the obligations set forth in this AGREEMENT, the Voluntary Party and Successor Parties (as hereinafter defined) shall bear no liability to the State of Tennessee under any statute administered by the Department for investigation, remediation, monitoring, treatment and/or maintenance of contamination identified in and addressed in this AGREEMENT (collectively referred to as the "*Matters Addressed in this Agreement*"); provided, however, that to the extent that the Voluntary Party or Successor Parties (as hereinafter defined) has or maintains an interest in the Site, or possesses and/or controls all or a portion of the Site, its liability protections hereunder are contingent upon its continued adherence and enforcement of any land use restrictions imposed pursuant to or as a result of this AGREEMENT, adherence to the soil management plan, and vapor mitigation system operation and maintenance described the Section H Agreed Actions to be Taken. Nothing in this AGREEMENT shall be construed as limiting the liability or potential liability of the Voluntary Party for contamination occurring after the effective date of this AGREEMENT. This liability protection and all other benefits conferred by this AGREEMENT are extended to all future "Successor Parties" conditioned upon performance of the obligations contained in this AGREEMENT, compliance with the Land Use Restrictions (hereinafter defined); provided and adherence to the soil management plan, and vapor mitigation system operation and maintenance described the Section H Agreed Actions to be Taken, that such liability protection to other persons does not apply to liability to the extent that such liability arose prior to the effective date of this AGREEMENT.

F. ADMINISTRATIVE SETTLEMENT; THIRD PARTY LIABILITY <u>(include first sentence below for inactive hazardous substance sites (including hazardous waste sites) only)</u>

This AGREEMENT also constitutes an administrative settlement for purposes of Section 113(f) of CERCLA, 42 U.S.C.§9613(f), pursuant to which the Voluntary Party and Successor

Parties (as hereinafter defined) have, as of the effective date of this AGREEMENT, resolved their liability to the State of Tennessee for *Matters Addressed in this Agreement*.

The Voluntary Party shall not be liable to third parties for contribution regarding *Matters Addressed in this Agreement*; provided that, the Voluntary Party gave the third party actual or constructive notice of this AGREEMENT, and the third party was given an actual or constructive opportunity to comment upon this AGREEMENT. The Voluntary Party has demonstrated to the Department that constructive notice was accomplished by publishing a summary of this AGREEMENT in the Knox News Sentinel at least thirty (30) days prior to the Effective Date of this AGREEMENT. Nothing in this AGREEMENT shall impair the rights of third parties with respect to tort liability claims for damage to person or property arising from the contamination addressed by the voluntary agreement.

G. LAND USE RESTRICTIONS

Upon acquiring the Site, the Voluntary Party agrees that said property will be restricted as follows:

1. Prior to any part of the Property being used for a residence, domicile, daycare, school, or church, the Grantor, its successors, and/or assigns must notify TDEC Division of Remediation and must demonstrate to the satisfaction of TDEC Division of Remediation that any such proposed use listed above will not pose a danger to public health, safety, or the environment.

2. Prior to the removal of soil from the Property, the Grantor, its successors, and/or assigns must notify TDEC Division of Remediation and must demonstrate to the satisfaction of TDEC Division of Remediation that any such proposed soil removal will not pose a danger to public health, safety, or the environment.

3. The Grantor, its successors, and/or assigns must notify TDEC Division of Remediation prior to any invasive activity on the Property including soil borings or potable groundwater wells. The Grantor, its successors, and/or assigns must demonstrate to the satisfaction of TDEC Division of Remediation, through sampling

and analysis approved by TDEC Division of Remediation, that any invasive activity will not pose a danger to public health, safety, or the environment.

4. Any new building construction on the property shall incorporate a vapor mitigation system designed to prevent subsurface vapor phase contamination from migrating into the structure at concentrations greater than applicable regulatory comparison criteria. Said vapor mitigation system plans shall be developed by a TDEC-approved remediation contractor and provided to the TDEC Division of Remediation for review prior to construction. After installation, the TDEC-approved contractor shall submit a written report to the TDEC Division of Remediation documenting how the system was installed, any deviations from the TDEC-reviewed plan, as built drawings, and an Operation and Maintenance Plan identifying continued care and operation and maintenance activities to be conducted to ensure the venting system is effective in preventing subsurface vapor phase contamination from migrating into the structure at concentrations greater than applicable screening levels.

5. The Grantor, its successors, and/or assigns shall be responsible for continued care, operation, and maintenance of the remedy. The Grantor, its successors, and/or assigns shall notify TDEC Division of Remediation in writing if the integrity of the remedy is compromised and take any steps necessary to eliminate the threat or potential threat to public health, safety, or the environment posed by the hazardous substance(s).

The Voluntary Party agrees that it will file any land use restriction identified by the Department as necessary for the safe use of the property in accordance with T.C.A. 68-212-225. Any Party receiving liability protection under this AGREEMENT that seeks approval for restricted uses or seeks to cancel or make a Restriction less stringent shall be responsible for any costs incurred by the Department in the review and oversight of work associated with the restriction modification. Upon filing, a copy of this notice shall be mailed to all local governments having jurisdiction over any part of the subject property.

H. AGREED ACTIONS TO BE TAKEN

1. The Voluntary Party agrees to send notification of this AGREEMENT by certified mail to all local governments having jurisdiction over any part of the subject property and to all owners of adjoining properties. The Voluntary Party shall provide adequate documentation to demonstrate that public notice has been accomplished.

2. The Voluntary Party agrees that criteria required in TCA 68-212-206(d) shall be used in determining containment and cleanup actions, including monitoring and maintenance options, to be followed under this Agreement.

3. The Voluntary Party agrees to equip all building structures with a vapor mitigation system designed to prevent subsurface vapor phase contamination from migrating into the structure at concentrations greater than applicable screening levels. The Voluntary Party will provide plans developed by a TDEC-approved remediation contractor for the vapor mitigation system to the Department for review prior to construction. Within 90 days following completion of the system, the Voluntary Party shall submit a written report documenting that the system was installed. The report shall include as-built drawings and an Operation and Maintenance Plan identifying activities that must be conducted to ensure the venting system is operated in an effective manner consistent with its design specifications.

4. The Voluntary Party agrees to prepare a Soil Management Plan for Department approval prior to the commencement of construction activities. The soil management plan will include, but not be limited to, characterization of any excavated materials, handling procedures to ensure that any offsite disposal of impacted media meets all State and Federal requirements, and, if needed, installation of a barrier or engineered cap. A Health and Safety Plan shall be submitted to the Department for review and comment.

5. The Voluntary Party agrees to perform the work set forth in the Soil Management Plan and the Voluntary Party shall submit a written report of its findings to the Department within 90 days of completion of such work. The report shall include, but not be limited to, as-built drawings, details of any capping, and waste manifests for

offsite disposal. The report shall also identify any areas where soil remains at the Site that must be managed in the future to protect human health, safety, or the environment and requirements for future soil management and maintenance of any covers or caps.

6. Upon completion of all tasks set forth in this AGREEMENT, the Department shall issue to the Voluntary Party a letter stating the requirements of this AGREEMENT have been fulfilled and no further action is required of the Voluntary Party concerning contamination identified and addressed in this AGREEMENT. Upon the request of the Voluntary Party from time to time, the Department shall issue an interim status letter identifying what specific obligations remain to achieve completion of the work under this AGREEMENT. Issuance of a no further action letter shall not relieve the Voluntary Party of any responsibilities for operation and maintenance activities or continued adherence to and enforcement of land use restrictions, if any, pursuant to T.C.A. § 68-212-225. The Department reserves the right to require additional action for contamination caused by the Voluntary Party occurring after the date of this AGREEMENT or for contamination not identified and addressed under this AGREEMENT, if any. Each Voluntary Party or successor in title to the Site shall be responsible for compliance with the requirements of this AGREEMENT during the period in which such person owns an interest in the Site, or possesses and/or controls all or a portion of the Site.

I. ADDITIONAL REQUIREMENTS

6. The Voluntary Party may request a time extension for any deadline included in this AGREEMENT prior to the deadline. The time extension may be granted through mutual consent for good cause shown.

7. The Voluntary Party shall be responsible for the following obligations during periods when it owns the Site:

(a) Comply with land use restrictions;

(b) Do not impede effectiveness or integrity of institutional controls;

(c) Provide cooperation, assistance and access;

(d) Whether or not permits are required for onsite cleanup activities, such activities shall meet the standards that would apply if such permits were required.

J. SITE ACCESS

During the effective period of this AGREEMENT, and until certification by the Department of completion of all activities under this AGREEMENT, the Department and its representatives or designees shall have access during normal business hours to the Site. Nothing herein shall limit or otherwise affect the Department's right of entry, pursuant to any applicable statute, regulation or permit. The Department and its representative shall comply with all reasonable health and safety plans published by the Voluntary Party or its contractor and used by Site personnel for the purpose of protecting life and property.

A. SUBMISSION OF INFORMATION, REPORTS, OR STUDIES

Any information, reports, or studies submitted under the terms of this AGREEMENT shall contain the following notarized statement:

"I certify under penalty of law, including but not limited to penalties for perjury, that the information contained in this document and on any attachment is true, accurate and complete to the best of my knowledge, information and belief. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for intentional violation."

B. RESERVATION OF RIGHTS

6. This AGREEMENT shall not be construed as waiving any right or authority available to the Commissioner to assess responsible parties other than the Voluntary Party for liability for civil penalties or damages incurred by the State, including any natural resource damage claims which the Department or the State of Tennessee may have under Section 107 of CERCLA or any other statute, rule, regulation or common law.

7. Nothing in this AGREEMENT shall be interpreted as limiting the Voluntary

Party's right to preserve the confidentiality of attorney work product or client-attorney communication. T.C.A. § 68-212-202 et seq. contains no provisions for confidentiality or proprietary information. Therefore, records, reports, test results, or other information submitted to the Department under this AGREEMENT shall be subject to public review. Any and all records, reports, test results or other information relating to a hazardous substance site or the possible hazardous substance at the Site submitted under this AGREEMENT may be used by the Department for all purposes set forth in T.C.A. § 68-212-201 et seq.

3. Voluntary Parties or Successor Parties may terminate this AGREEMENT as it pertains to them at any time upon written notice to the Department during the time period that they own the site and/or conduct operations at the site. Upon such termination, the Voluntary Party shall have no further obligations hereunder other than payment of oversight costs accrued to the date of notice of termination and adherence to any notice of land use controls filed under TCA 68-212-225; provided, that both Parties shall have and retain all authority, rights and defenses as if this AGREEMENT had never existed.

8. The Department may terminate this AGREEMENT by written notice to the Voluntary Party in the event that the Department receives timely comments from third-party contribution claim holders pursuant to the notice sent under Section F of this AGREEMENT, if any, and such comments disclose facts or considerations that indicate that this AGREEMENT is inappropriate, improper or inadequate; provided, however, absent fraud or intentional misconduct, that in such event the Voluntary Party may elect to waive the protections set forth in Section F hereunder and the remainder of the terms and conditions of this AGREEMENT shall continue to be in full force and effect. The Department's notice of termination must be made within thirty (30) days of the end of the 30-day notice period required by Section F. The Voluntary Party's waiver notice must be made within fifteen (15) days after receipt of the Department's termination notice.

9. The Department reserves the right to terminate this agreement if the Voluntary

Party fails to timely pay fees and other financial requirements specified in Section C Financial Requirements. For the purpose of this AGREEMENT, timely payment means the Department receiving payment from the Voluntary Party within 120 days of the first billing of a financial requirement or according to a payment plan agreed in writing between Voluntary Party and the Department.

6. If any provision of this AGREEMENT is held to be invalid or enforceable by a court of competent jurisdiction, then the remaining provisions of this AGREEMENT will remain in full force and effect.

10. Nothing in this AGREEMENT shall be interpreted as limiting the liability for the improper management and/or disposal of contaminated material removed from the site.

The individual(s) signing below on behalf of the Voluntary Party **[represent that they have the authority or are] [**represents that he is a] duly authorized agent(s), capable of entering into a binding AGREEMENT on behalf of the Voluntary Party. By entering into this AGREEMENT, [**these individuals certify**][this individual certifies] that the Voluntary Party did not generate or did not cause to generate, transport or release contamination that is to be addressed at this site.

The Effective Date of this AGREEMENT is the thirtieth (30th) day after the publication of the notice described in Section F of this AGREEMENT.

Date		Date	Voluntary Party:
	Program Administrator Division of Remediation		

Appendix IV – NEO Asbestos Abatement Final Submittal and Domermuth Drum Disposal Documentation

S&ME Inc. – City of Knoxville
Knoxville, TN

Asbestos Abatement Final Submittal
NEO Corporation Project #: 7-30043-07

NEO
CORPORATION

NEO CORPORATION
289 Silkwood Drive, Canton, North Carolina 28716
Environmental, Industrial and Demolition Services

January 8, 2018

S&ME Inc.
Ms. Liz Porter
1413 Topside Road
Louisville, Tennessee 377777

RE: City of Knoxville
Asbestos Abatement Final Submittal
NEO Corporation Project #: 7-30043-07

Dear Ms. Porter:

Attached please find a copy of the asbestos abatement final submittal for the above referenced project.

Should you have questions or require additional information, please contact me at 828-456-4332. NEO Corporation is pleased to provide quality environmental maintenance services to the City of Knoxville.

Sincerely,

NEO Corporation

Lauren Armeni

Lauren Armeni
Compliance Administrator

File: 7-30043-07

NEO CORPORATION

S&ME Inc. – City of Knoxville
Knoxville, TN

Asbestos Abatement Final Submittal

Contents

S&ME Inc. – City of Knoxville
Knoxville, TN

Asbestos Abatement Final Submittal

Contents

KNOX COUNTY
DEPARTMENT OF AIR QUALITY MANAGEMENT

ASBESTOS DEMOLITION/RENOVATION PERMIT

PERMIT NO: KCA17040
Issued: 24 OCTOBER 2017

CONTRACTOR NAME: NEO Corporation

MAILING ADDRESS: 289 Silkwood Drive
Canton, North Carolina 28716

CONTACT: Candice Lance PHONE: (828) 456-4332

NAME/LOCATION OF PROJECT: City Laundry Building
625 North Broadway
Knoxville, TN 37917

DEMOLITION: NO

REMOVAL: YES

DATES OF REMOVAL: 10/20/2017 TO 11/15/2017 12/18/17 to 12/31/17
DATES OF DEMOLITION: TO

Approved:

Asbestos Present? YES

RACM? YES
If yes, describe and list amounts: 895 LF TSI, 400 SF Wrap

Nonfriable Category I to be removed? NO
If yes, describe and list amounts:

Nonfriable Category II to be removed? YES
If yes, describe and list amounts: 1,665 SF Floor Tile, 800 SF Ceiling Cork Board

Nonfriable Category I not to be removed? NO
If yes, describe and list amounts:

Nonfriable Category II not to be removed? NO
If yes, describe and list amounts:

Permit must be available on project site at all times.

(865) 215-5900 ● 140 Dameron Avenue, Knoxville, TN 37917 ● (865) 215-5902 (Fax)

S&ME Inc. – City of Knoxville
Knoxville, TN

Asbestos Abatement Final Submittal

Contents

NEO Corporation

Daily Log/Time Sheet

7-30043-07

JOB#: 7-30043-07	DATE: 12-18-17	SUPERVISOR: Mike Robinson	
JOB NAME: City of Knoxville Smith	JOB LOCATION: Knoxville		DAY: Mon

TYPE OF WORK / CIRCLE ONE (ASBESTOS) INSULATION LEAD INDUSTRIAL CONSULTING

Employee Role: Supervisor + Worker

EMPLOYEE NAME	IN	OUT	IN	OUT	# of Hours	Employee#	Dept Code	Phase Code	Per Diem
1. [redacted]	7:00	11:30	12:00	5:30	10		7	100	
2. [redacted]							[redacted]	[redacted]	
3.									
4.									
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.					10				

Summary of Work Completed Today/Special Events/Etc.

Mobilized to job site setup. neg air prep
Removal of Mastic on top floor underneg pressure
with wet Method Double bag took Bags to Dumpster
HepA vac and secured area

Accidents Today? (circle one) Yes (No) **If yes, explain above**

Visitors Today

Name/Company	Name Company
1.	3.
2.	4.

NEO Corporation

CRM

Daily Log/Time Sheet

JOB#: 7-30043.07	DATE: 12-18-17	SUPERVISOR: Mike Robinson
JOB NAME: Sfme City of Knox.	JOB LOCATION: Knoxville	DAY: Mon

TYPE OF WORK / CIRCLE ONE ASBESTOS INSULATION LEAD INDUSTRIAL CONSULTING

Employee Role: Worker

EMPLOYEE NAME	IN	OUT	IN	OUT	# of Hours	Employee#	Dept Code	Phase Code	Per Diem
1. Yicmara Estrada	7:00	11:30	12	5:30	10		7	200	
2. Gilliam Hernandez	7:00	11:30	12	5:30	10		7	200	
3. Esdras Lopez	7:00	11:30	12	5:30	10		7	200	
4. Francisco Merino	7:00	11:30	12	5:30	10		7	200	
5. Herson Garcia	7:00	11:30	12	5:30	10		7	200	
6.									
7.									
8.									
9.									
10.									
11.									
12.					50				

Summary of Work Completed Today/Special Events/Etc.

Accidents Today? (circle one) Yes (No) **If yes, explain above**

Visitors Today

Name/Company **Name Company**

1. 3.

2. 4.

NEO Corporation CRM

Daily Log/Time Sheet

JOB#: 7-30043-07	DATE: 12-18-17	SUPERVISOR: Mike Robinson
JOB NAME: Stone City of Knox	JOB LOCATION: Knoxville	DAY: Mon

TYPE OF WORK / CIRCLE ONE ASBESTOS INSULATION LEAD INDUSTRIAL CONSULTING (Demo)

Employee Role: Worker

EMPLOYEE NAME	IN	OUT	IN	OUT	# of Hours	Employee#	Dept Code	Phase Code	Per Diem
1. Jose Qubon	7:00	11:30	12:00	5:30	10		7	200	
2. Milton Cruz	7:00	11:30	12:00	5:30	10		7	200	
3.									
4.									
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.					20				

Summary of Work Completed Today/Special Events/Etc.

Accidents Today? (circle one) Yes (No) **If yes, explain above**

Visitors Today

Name/Company **Name Company**

1. 3.

2. 4.

NEO Corporation

Cumberland

Daily Log/Time Sheet

JOB#: 7-30043-07	DATE: 12-18-17	SUPERVISOR: Mike Robinson
JOB NAME: Stone City of Knox	JOB LOCATION: Knoxville	DAY: Mon

TYPE OF WORK / CIRCLE ONE (ASBESTOS) INSULATION LEAD INDUSTRIAL CONSULTING

Employee Role: worker

EMPLOYEE NAME	IN	OUT	IN	OUT	# of Hours	Employee#	Dept Code	Phase Code	Per Diem
1. Yessica Ortiz	7:00	11:30	12:00	5:30	10		7	200	
2. Michel Rodriguez	7:00	11:30	12:00	5:30	10		7	200	✓
3. Luis Del Llano Sr	7:00	11:30	12:00	5:30	10		7	200	✓
4. Luis Del Llano JR	7:00	11:30	12:00	5:30	10		7	200	✓
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.					40				

Summary of Work Completed Today/Special Events/Etc.

Accidents Today? (circle one) Yes (No) **If yes, explain above**

Visitors Today

Name/Company **Name Company**

1. 3.

2. 4.

NEO Corporation

Daily Log/Time Sheet

7-30043-07

JOB#: 7-30043-07	DATE: 12-19-17	SUPERVISOR: Mike Robinson
JOB NAME: Same	JOB LOCATION: 625 W. Broadway	DAY: Tues

TYPE OF WORK / CIRCLE ONE (ASBESTOS) INSULATION LEAD INDUSTRIAL CONSULTING

Employee Role: Supervisor/worker

EMPLOYEE NAME	IN	OUT	IN	OUT	# of Hours	Employee#	Dept Code	Phase Code	Per Diem
1.	7:00	11:30	12:00	5:30	10		7	100	
2. Scott Daulton	7:00	11:30	12:00	5:30	10		7	200	
3.									
4.									
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.					20				

Summary of Work Completed Today/Special Events/Etc.

Mobilized to job Site Removal of 4 pipe flanges on 1st floor and Removal of TSI from Basement Fine Cleaned Hepa Vac Underneg pressure with wet Method Double Bag tool Bags to Dumpster and secured area

Accidents Today? (circle one) Yes (No) **If yes, explain above**

Visitors Today

Name/Company	Name Company
1.	3.
2.	4.

CRM

NEO Corporation

Daily Log/Time Sheet

JOB#: 7-30043-07	DATE: 12-19-17	SUPERVISOR: Mike Robinson
JOB NAME: Stone City of Knox	JOB LOCATION: Knoxville	DAY: Tues

TYPE OF WORK / CIRCLE ONE ASBESTOS INSULATION LEAD INDUSTRIAL CONSULTING (Demo)

Employee Role: worker

EMPLOYEE NAME	IN	OUT	IN	OUT	# of Hours	Employee#	Dept Code	Phase Code	Per Diem
1. Jose Dubon	7:00	11:30	12	5:30	10		7	200	
2. Milton Cruz	7:00	11:30	12	5:30	10		7	200	
3.									
4.									
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.					20				

Summary of Work Completed Today/Special Events/Etc.

Accidents Today? (circle one) Yes (No) **If yes, explain above**

Visitors Today

Name/Company	Name Company
1.	3.
2.	4.

NEO Corporation

CRM

Daily Log/Time Sheet

JOB#: 7-30043-07	DATE: 12-19-17	SUPERVISOR: Mike Robinson
JOB NAME: Stone City of Knox	JOB LOCATION: Knoxville	DAY: Tues

TYPE OF WORK / CIRCLE ONE ASBESTOS (E) INSULATION LEAD INDUSTRIAL CONSULTING

Employee Role: Worker

EMPLOYEE NAME	IN	OUT	IN	OUT	# of Hours	Employee#	Dept Code	Phase Code	Per Diem
1. Ramiro Estrada	7:00	11:30	12:00	5:30	10		7	200	
2. William Hernandez	7:00	11:30	12:00	5:30	10		7	200	
3. Esdras Lopez	7:00	11:30	12:00	5:30	10		7	200	
4. Francisco Merino	7:00	11:30	12:00	5:30	10		7	200	
5. Herson Garcia	7:00	11:30	12:00	5:30	10		7	200	
6.									
7.									
8.									
9.									
10.									
11.									
12.					50				

Summary of Work Completed Today/Special Events/Etc.

Accidents Today? (circle one) Yes (No) **If yes, explain above**

Visitors Today

Name/Company	Name Company
1.	3.
2.	4.

NEO Corporation Cumberland

Daily Log/Time Sheet

JOB#: 7-30043-07	DATE: 12-19-17	SUPERVISOR: Mike Robinson
JOB NAME: Some City of Knox	JOB LOCATION: Knoxville	DAY: Tues

TYPE OF WORK / CIRCLE ONE ASBESTOS (F) INSULATION LEAD INDUSTRIAL CONSULTING

Employee Role: worker

EMPLOYEE NAME	IN	OUT	IN	OUT	# of Hours	Employee#	Dept Code	Phase Code	Per Diem
1. Yessica Ortiz	7:00	11:30	12	5:30	10		7	200	
2. Manuel Cruz	7:00	11:30	12	5:30	10		7	200	
3. Leyda Ransvary	7:00	11:30	12	5:30	10		7	200	
4. Michel Rodriguez	7:00	11:30	12	5:30	10		7	200	—
5. Luis Del Llano JR	7:00	11:30	12	5:30	10		7	200	—
6. Luis Del Llano JR	7:00	11:30	12	5:30	10		7	200	—
7.									
8.									
9.									
10.									
11.									
12.					60				

Summary of Work Completed Today/Special Events/Etc.

Accidents Today? (circle one) Yes (~~No~~) **If yes, explain above**

Visitors Today

Name/Company	Name Company
1.	3.
2.	4.

NEO Corporation

Daily Log/Time Sheet

JOB#: 7-30043-07	DATE: 12-20-17	SUPERVISOR: Mike Robinson
JOB NAME: Stme	JOB LOCATION: Knoxville	DAY: Wed

TYPE OF WORK / CIRCLE ONE (ASBESTOS) INSULATION LEAD INDUSTRIAL CONSULTING

Employee Role: Supervisor Worker

EMPLOYEE NAME	IN	OUT	IN	OUT	# of Hours	Employee#	Dept Code	Phase Code	Per Diem
1. Matt	7:00	11:30	12:00	5:30	10		7	100	
2. Scott Smith	7:00	11:30	12:00	5:30	10		7	200	
3.									
4.									
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.					20				

Summary of Work Completed Today/Special Events/Etc.

Mobilized to job site Removal of TSI on North side under Neg pressure with wet Method Double Bag took Bags to Dumpster Fine Cleaned Hepa Vac and Secured area

Accidents Today? (circle one) Yes (No) **If yes, explain above**

Visitors Today

Name/Company	Name Company
1.	3.
2.	4.

NEO Corporation CRM

Daily Log/Time Sheet

JOB#: 7-30043-07	DATE: 12-20-17	SUPERVISOR: Mike Robinson	
JOB NAME: Stme City of Knox	JOB LOCATION: Knoxville		DAY: WED

TYPE OF WORK / CIRCLE ONE ASBESTOS INSULATION LEAD INDUSTRIAL CONSULTING

Employee Role: Worker

EMPLOYEE NAME	IN	OUT	IN	OUT	# of Hours	Employee#	Dept Code	Phase Code	Per Diem
1. Ramon Estrada	7:00	11:30	12	5:30	10		7	200	
2. William Hinandez	7:00	11:30	12	5:30	10		7	200	
3. Esdras Lopez	7:00	11:30	12	5:30	10		7	200	
4. Herson Garcia	7:00	11:30	12	5:30	10		7	200	
5. Francisco Merino	7:00	11:30	12	5:30	10		7	200	
6.									
7.									
8.									
9.									
10.									
11.									
12.					50				

Summary of Work Completed Today/Special Events/Etc.

Accidents Today? (circle one) Yes (No) **If yes, explain above**

Visitors Today

Name/Company	Name Company
1.	3.
2.	4.

NEO Corporation

CRM

Daily Log/Time Sheet

JOB#: 7-30043-07	DATE: 12-20-17	SUPERVISOR: Mike Robinson
JOB NAME: State City of Knox	JOB LOCATION: Knoxville	DAY: Wed

TYPE OF WORK / CIRCLE ONE ASBESTOS INSULATION LEAD INDUSTRIAL CONSULTING (Demo)

Employee Role: worker

EMPLOYEE NAME	IN	OUT	IN	OUT	# of Hours	Employee#	Dept Code	Phase Code	Per Diem
1. Jose Dubon	7:00	11:30	12:00	5:30	10		7	200	
2. Mitton Cruz	7:00	11:30	12:00	5:30	10		7	200	
3.									
4.									
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.					20				

Summary of Work Completed Today/Special Events/Etc.

Accidents Today? (circle one) Yes (No) **If yes, explain above**

Visitors Today

Name/Company **Name Company**

1. 3.

2. 4.

NEO Corporation

Cumberland

Daily Log/Time Sheet

JOB#: 7-30043-07	DATE: 12-20-17	SUPERVISOR: Mike Robinson
JOB NAME: State City of Knox	JOB LOCATION: Knoxville	DAY: Wed

TYPE OF WORK / CIRCLE ONE ASBESTOS INSULATION LEAD INDUSTRIAL CONSULTING

Employee Role: worker

EMPLOYEE NAME	IN	OUT	IN	OUT	# of Hours	Employee#	Dept Code	Phase Code	Per Diem
1. Yessica Ortiz	7:00	11:30	12	5:30	10		7	200	
2. Manuel Cruz	7:00	11:30	12	5:30	10		7	200	
3. Leyda Ransuary	7:00	11:30	12	5:30	10		7	200	
4. Luis Del Llano SR.	7:00	11:30	12	5:30	10		7	200	✓
5. Luis Del Llano JR.	7:00	11:30	12	5:30	10		7	200	✓
6. Michel Rodriguez	7:00	11:30	12	5:30	10		7	200	✓
7.									
8.									
9.									
10.									
11.									
12.					60				

Summary of Work Completed Today/Special Events/Etc.

Accidents Today? (circle one) Yes (No) **If yes, explain above**

Visitors Today

Name/Company **Name Company**

1.

2.

3.

4.

NEO Corporation

Daily Log/Time Sheet

JOB#: 7-300 43-07	DATE: 12-21-17	SUPERVISOR: Mike Robinson
JOB NAME: Stone	JOB LOCATION: 625 N Broadway	DAY: Thurs

TYPE OF WORK / CIRCLE ONE (ASBESTOS) INSULATION LEAD INDUSTRIAL CONSULTING

Employee Role: Supervisor/worker

EMPLOYEE NAME	IN	OUT	IN	OUT	# of Hours	Employee#	Dept Code	Phase Code	Per Diem
1. MR	7:00	11:30	12:00	5:30	10		7	100	
2. [redacted]									
3.									
4.									
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.					10				

Summary of Work Completed Today/Special Events/Etc.

Mobilized to job Site Removal of Asbestos tar on Ceilings Panels under neg pressure with wet Method Double Bag took Bags to Dumpster Pine cleaned HepA Vac and secured area

Accidents Today? (circle one) Yes (No) **If yes, explain above**

Visitors Today

Name/Company	Name Company
1.	3.
2.	4.

NEO Corporation

CRM

Daily Log/Time Sheet

JOB#: 7-30043-07	DATE: 12-21-17	SUPERVISOR: Mike Robinson
JOB NAME: Stone City of Knox	JOB LOCATION: Knoxville	DAY: THURS

TYPE OF WORK / CIRCLE ONE ASBESTOS INSULATION LEAD INDUSTRIAL CONSULTING (Demo)

Employee Role: worker

EMPLOYEE NAME	IN	OUT	IN	OUT	# of Hours	Employee#	Dept Code	Phase Code	Per Diem
1. Jose Dubon	7:00	11:30	12:00	5:30	10		7	200	
2. Milton Cruz	7:00	11:30	12:00	5:30	10		7	200	
3.									
4.									
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.					20				

Summary of Work Completed Today/Special Events/Etc.

Accidents Today? (circle one) Yes (No) **If yes, explain above**

Visitors Today

Name/Company	Name Company
1.	3.
2.	4.

NEO Corporation

CRM

Daily Log/Time Sheet

JOB#: 7-30043-07	DATE: 12-21-17	SUPERVISOR: Mike Robinson
JOB NAME: Sirme City of Knox	JOB LOCATION: Knoxville	DAY: Thurs.

TYPE OF WORK / CIRCLE ONE ASBESTOS (R) INSULATION LEAD INDUSTRIAL CONSULTING

Employee Role: worker

EMPLOYEE NAME	IN	OUT	IN	OUT	# of Hours	Employee#	Dept Code	Phase Code	Per Diem
1. Yiomara Estrada	7:00	11:30	12	5:30	10		7	200	
2. William Hernandez	7:00	11:30	12	5:30	10		7	200	
3. Esdras Lopez	7:00	11:30	12	5:30	10		7	200	
4. Francisco Menio	7:00	11:30	12	5:30	10		7	200	
5. Herson Garcia	7:00	11:30	12	5:30	10		7	200	
6.									
7.									
8.									
9.									
10.									
11.									
12.					50				

Summary of Work Completed Today/Special Events/Etc.

Accidents Today? (circle one) Yes (No) **If yes, explain above**

Visitors Today

Name/Company **Name Company**

1. 3.

2. 4.

NEO Corporation Cumberland

Daily Log/Time Sheet

JOB#: 7-30043-07	DATE: 12-21-17	SUPERVISOR: Mike Robinson
JOB NAME: Some City of Knox	JOB LOCATION: Knoxville	DAY: Thurs.

TYPE OF WORK / CIRCLE ONE ASBESTOS (E) INSULATION LEAD INDUSTRIAL CONSULTING

Employee Role: worker

EMPLOYEE NAME	IN	OUT	IN	OUT	# of Hours	Employee#	Dept Code	Phase Code	Per Diem
1. Yessica ortiz	7:00	11:30	12	5:30	10		7	200	
2. Michel Rodriguez	7:00	11:30	12	5:30	10		7	200	—
3. Luis Del Llano SR	7:00	11:30	12	5:30	10		7	200	—
4. Luis Del Llano JR.	7:00	11:30	12	5:30	10		7	200	—
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.					40				

Summary of Work Completed Today/Special Events/Etc.

Accidents Today? (circle one) Yes (No) **If yes, explain above**

Visitors Today

Name/Company	Name Company
1.	3.
2.	4.

NEO Corporation

Daily Log/Time Sheet

JOB#: 7-30043-07	DATE: 12-26-17	SUPERVISOR: Mike Robinson
JOB NAME: Stone (City of Knox.)	JOB LOCATION: 625 N Broadway	DAY: ~~Wed~~ Tues

TYPE OF WORK / CIRCLE ONE ASBESTOS (F) INSULATION LEAD INDUSTRIAL CONSULTING

Employee Role: Supervisor

EMPLOYEE NAME	IN	OUT	IN	OUT	# of Hours	Employee#	Dept Code	Phase Code	Per Diem
1. [signature]	7:00	11:30	12:00	5:30	10		7	100	
2. [signature]	7:00	11:30	12:00	5:30	10		7	200	
3.									
4.									
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.					20				

Summary of Work Completed Today/Special Events/Etc.

Mobilized to job site Removal of TSI on south end underpass pressure with wet Method Double bag Hook Bags in Dumpster fine cleaned HepA Vac and Secured area

Accidents Today? (circle one) Yes (No) **If yes, explain above**

Visitors Today

Name/Company	Name Company
1.	3.
2.	4.

CRM

NEO Corporation

Daily Log/Time Sheet

JOB#: 7.300 43-07	DATE: 12-26-17	SUPERVISOR: Mike Robinson
JOB NAME: Sme (City of Knox)	JOB LOCATION: 625 N Broadway	DAY: Tues

TYPE OF WORK / CIRCLE ONE ASBESTOS (F) INSULATION LEAD INDUSTRIAL CONSULTING

Employee Role: Worker

EMPLOYEE NAME	IN	OUT	IN	OUT	# of Hours	Employee#	Dept Code	Phase Code	Per Diem
1. Xiomara Estrada	7:00	11:30	12	5:30	10		7		
2. Jose Dubon	7:00	11:30	12	5:30	10		7		
3. William Herandez	7:00	11:30	12	5:30	10		7		
4. [redacted]									
5. Francisco Merino	7:00	11:30	12	5:30	10		7		
6. Herson Garcia	7:00	11:30	12	5:30	10		7		
7. Esdras lopez	7:00	11:30	12	5:30	10		7		
8.									
9.									
10.									
11.									
12.					60				

Summary of Work Completed Today/Special Events/Etc.

Accidents Today? (circle one) Yes (No) **If yes, explain above**

Visitors Today

Name/Company	Name Company
1.	3.
2.	4.

CRM

NEO Corporation

Daily Log/Time Sheet

JOB#: 7-30043-07	DATE: 12-26-17	SUPERVISOR: Mike Robinson
JOB NAME: State (City of Knox)	JOB LOCATION: 625 N. Broadway	DAY: Tues.

TYPE OF WORK / CIRCLE ONE ASBESTOS INSULATION LEAD INDUSTRIAL CONSULTING (Demo)

Employee Role: worker

EMPLOYEE NAME	IN	OUT	IN	OUT	# of Hours	Employee#	Dept Code	Phase Code	Per Diem
1. Milton Cruz	7:00	11:30	12:00	5:30	10		7	200	
2.									
3.									
4.									
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.					10				

Summary of Work Completed Today/Special Events/Etc.

Accidents Today? (circle one) Yes (No) **If yes, explain above**

Visitors Today

Name/Company **Name Company**

1. 3.

2. 4.

Cumberland

NEO Corporation

Daily Log/Time Sheet

JOB#: 7-30043-07	DATE: 12-26-17	SUPERVISOR: Mike Robinson
JOB NAME: Some(City of Knox)	JOB LOCATION: 625 N. Broadway	DAY: Tues

TYPE OF WORK / CIRCLE ONE ASBESTOS (F) INSULATION LEAD INDUSTRIAL CONSULTING

Employee Role: Worker

EMPLOYEE NAME	IN	OUT	IN	OUT	# of Hours	Employee#	Dept Code	Phase Code	Per Diem
1. Yessica Ortiz	7:00	11:30	12:00	5:30	10		7	200	
2. Manuel Cruz	7:00	11:30	12:00	5:30	10		7	200	
3. Loyda Ramsey	7:00	11:30	12:00	5:30	10		7	200	
4. Luis Del Llano SR.	7:00	11:30	12:00	5:30	10		7	200	
5. Luis Del Llano JR.	7:00	11:30	12:00	5:30	10		7	200	
6. Michle Rodriguez	7:00	11:30	12:00	5:30	10		7	200	
7.									
8.									
9.									
10.									
11.									
12.					60				

Summary of Work Completed Today/Special Events/Etc.

Accidents Today? (circle one) Yes (No) **If yes, explain above**

Visitors Today

Name/Company **Name Company**

1. 3.

2. 4.

NEO Corporation

Daily Log/Time Sheet

JOB#: 7-300473-07	DATE: 12-27-17	SUPERVISOR: Mike Robinson
JOB NAME: State (City of Knox)	JOB LOCATION: 625 N. Broadway	DAY: Wed

TYPE OF WORK / CIRCLE ONE ASBESTOS INSULATION LEAD INDUSTRIAL CONSULTING

Employee Role: Supervisor

EMPLOYEE NAME	IN	OUT	IN	OUT	# of Hours	Employee#	Dept Code	Phase Code	Per Diem
1. MA	7:00	11:30	12:00	5:30	10		7	100	
2.									
3.									
4.									
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.					10				

Summary of Work Completed Today/Special Events/Etc.

Mobilized to job Site Removal of Asbestos on Boiler Double Bag took Bags to Dumpster under Neg pressure with wet Method Fire cleaned and secured area

Accidents Today? (circle one) Yes (No) **If yes, explain above**

Visitors Today

Name/Company	Name Company
1.	3.
2.	4.

NEO Corporation

CRM

Daily Log/Time Sheet

JOB#: 7-30043-07	DATE: 12-27-17	SUPERVISOR: Mike Robinson
JOB NAME: SAME - Knoxville	JOB LOCATION: Broadway	DAY: Wed

TYPE OF WORK /CIRCLE ONE (ASBESTOS) INSULATION LEAD INDUSTRIAL CONSULTING

Employee Role: F

EMPLOYEE NAME	IN	OUT	IN	OUT	# of Hours	Employee #	Dept Code	Phase Code	Per Diem
1. Francisco Meriano	7	11:30	12	5:30	10		7		
2. Herson Garcia	7	11:30	12	5:30	10		7		
3. Esdras Lopez	7	11:30	12	5:30	10		7		
4.									
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.					36				

Summary of Work Completed Today/Special Events/Etc.

Accidents Today? (circle one) Yes (No) **If yes, explain above**

Visitors Today

Name/Company **Name/Company**

1. 3.

2. 4.

NEO Corporation

Cumberland

Daily Log/Time Sheet

JOB#: 7-30043-07	DATE: 12-27-17	SUPERVISOR: Mike Robinson
JOB NAME: Stme (City of Knox)	JOB LOCATION: 625 N Broadway	DAY: Wed

TYPE OF WORK / CIRCLE ONE ASBESTOS INSULATION LEAD INDUSTRIAL CONSULTING

Employee Role:

EMPLOYEE NAME	IN	OUT	IN	OUT	# of Hours	Employee#	Dept Code	Phase Code	Per Diem
1. Yessica Ortiz	7:00	11:30	12:00	5:30	10		7	200	
2. Manuel Cruz	7:00	11:30	12:00	5:30	10		7	200	
3. Leyda Ransvary	7:00	11:30	12:00	5:30	10		7	200	
4. Michel Rodriguez	7:00	11:30	12:00	5:30	10		7	200	
5. Luis Del Llano JR	7:00	11:30	12:00	5:30	10		7	200	
6. Luis Del Llano SR.	7:00	11:30	12:00	5:30	10		7	200	
7.									
8.									
9.									
10.									
11.									
12.					60				

Summary of Work Completed Today/Special Events/Etc.

Accidents Today? (circle one) Yes (No) **If yes, explain above**

Visitors Today

Name/Company **Name Company**

1. 3.

2. 4.

NEO Corporation

Daily Log/Time Sheet

7-30043-07

JOB#: 7-30043-07	DATE: 12-28-17	SUPERVISOR: Mike Robinson
JOB NAME: St Me (City of Knox	JOB LOCATION: 625 N Broadway	DAY: THURS

TYPE OF WORK / CIRCLE ONE ASBESTOS (F) INSULATION LEAD INDUSTRIAL CONSULTING

Employee Role:

EMPLOYEE NAME	IN	OUT	IN	OUT	# of Hours	Employee#	Dept Code	Phase Code	Per Diem
1. [signature]	7:00	11:30	12:00	5:30	10		7	100	
2.									
3.									
4.									
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.					10				

Summary of Work Completed Today/Special Events/Etc.

Mobilized to job Site Removal of TSI under neg pressure with wet Method Double Bag put Bags into Dumpster fine cleaned HepA vac & secured area

Accidents Today? (circle one) Yes (No) **If yes, explain above**

Visitors Today

Name/Company	Name Company
1.	3.
2.	4.

CRM

NEO Corporation

Daily Log/Time Sheet

JOB#: 7-30043-07	DATE: 12-28-17	SUPERVISOR: Mike Robinson
JOB NAME: SME Knoxville	JOB LOCATION: Broadway	DAY: Thur

TYPE OF WORK /CIRCLE ONE (ASBESTOS) INSULATION LEAD INDUSTRIAL CONSULTING

Employee Role: F

EMPLOYEE NAME	IN	OUT	IN	OUT	# of Hours	Employee #	Dept Code	Phase Code	Per Diem
1. Francisco Merino	7	11 30	12	5 30	10		7	200	
2. Herson Garcia	7	11 30	12	5 30	10		7	200	
3. Esdras Lopez	7	11 30	12	5 30	10		7	200	
4.									
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.					30				

Summary of Work Completed Today/Special Events/Etc.

Accidents Today? (circle one) Yes (No) **If yes, explain above**

Visitors Today

Name/Company **Name/Company**

1. 3.

2. 4.

Cumberland

NEO Corporation

Daily Log/Time Sheet

JOB#: 2-30043-07	DATE: 12-28-17	SUPERVISOR: Mike Robinson
JOB NAME: Stone City of Knox	JOB LOCATION: 625 N. Broadway	DAY: THURS

TYPE OF WORK / CIRCLE ONE ASBESTOS (F) INSULATION LEAD INDUSTRIAL CONSULTING

Employee Role: Worker

EMPLOYEE NAME	IN	OUT	IN	OUT	# of Hours	Employee#	Dept Code	Phase Code	Per Diem
1. Yessica Ortiz	7:00	11:30	12:00	5:30	10		7	200	
2. Manuel Cruz	7:00	11:30	12:00	5:30	10		7	200	
3. Leyda Ransuary	7:00	11:30	12:00	5:30	10		7	200	
4. Luis Del Llano SR.	7:00	11:30	12:00	5:30	10		7	200	
5. Luis Del Llano JR.	7:00	11:30	12:00	5:30	10		7	200	
6. Michel Rodriguez	7:00	11:30	12:00	5:30	10		7	200	
7.									
8.									
9.									
10.									
11.									
12.					60				

Summary of Work Completed Today/Special Events/Etc.

Accidents Today? (circle one) Yes (No) **If yes, explain above**

Visitors Today

Name/Company **Name Company**

1. 3.

2. 4.

NEO Corporation

Daily Log/Time Sheet

JOB#: 7-30043-07	DATE: 12-29-17	SUPERVISOR: Mike Robinson
JOB NAME: Some (City of Knox)	JOB LOCATION: 625 N. Broadway	DAY: Fri

TYPE OF WORK / CIRCLE ONE ASBESTOS (F) INSULATION LEAD INDUSTRIAL CONSULTING

Employee Role: Supervisor

EMPLOYEE NAME	IN	OUT	IN	OUT	# of Hours	Employee#	Dept Code	Phase Code	Per Diem
1.	7:00	11:30	12:00	5:30	10		7	100	
2. Scott Swanton	7:00	11:30	12:00	5:30	10		7	200	
3.									
4.									
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.					20				

Summary of Work Completed Today/Special Events/Etc.

Mobilized to jobsite Removal of TSI under neg. pressure with wet Method Double Bag Fine Cleaned HepaVac & Secured area

Accidents Today? (circle one) Yes (No) **If yes, explain above**

Visitors Today

Name/Company	Name Company
1.	3.
2.	4.

CRM

NEO Corporation

Daily Log/Time Sheet

JOB#: 7-30043-07	DATE: 12-29-17	SUPERVISOR: Mike Robinson
JOB NAME: Stme (City of Knox)	JOB LOCATION: 625 N. Broadway	DAY: Fri.

TYPE OF WORK / CIRCLE ONE ASBESTOS (E) INSULATION LEAD INDUSTRIAL CONSULTING

Employee Role: worker

EMPLOYEE NAME	IN	OUT	IN	OUT	# of Hours	Employee#	Dept Code	Phase Code	Per Diem
1. Jose Dubon	7:00	11:30	12	5:30	10		7	200	
2. Yomara Estrado	7:00	11:30	12	5:30	10		7	200	
3. Francisco Merino	7:00	11:30	12	5:30	10		7	200	
4. Herson Garcia	7:00	11:30	12	5:30	10		7	200	
5. Esdras Lopez	7:00	11:30	12	5:30	10		7	200	
6. Jilliam Hernandez	7:00	11:30	12	5:30	10		7	200	
7.									
8.									
9.									
10.									
11.									
12.					60				

Summary of Work Completed Today/Special Events/Etc.

Accidents Today? (circle one) Yes (No) **If yes, explain above**

Visitors Today

Name/Company	Name Company
1.	3.
2.	4.

CRM

NEO Corporation

Daily Log/Time Sheet

JOB#: 7-30093-07	DATE: 12-29-17	SUPERVISOR: Mike Robinson
JOB NAME: Sme (City of Knox	JOB LOCATION: 625 N. Broadway	DAY: Fri.

TYPE OF WORK / CIRCLE ONE ASBESTOS INSULATION LEAD INDUSTRIAL CONSULTING (Demo)

Employee Role: Worker

EMPLOYEE NAME	IN	OUT	IN	OUT	# of Hours	Employee#	Dept Code	Phase Code	Per Diem
1. Milton Cruz	7:00	11:30	12:00	5:30	10		7	200	
2.									
3.									
4.									
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.					10				

Summary of Work Completed Today/Special Events/Etc.

Accidents Today? (circle one) Yes (No) **If yes, explain above**

Visitors Today

Name/Company	Name Company
1.	3.
2.	4.

NEO Corporation Comberland

Daily Log/Time Sheet

JOB#: 7-30043-07	DATE: 12-29-17	SUPERVISOR: Mike Robinson
JOB NAME: Stme(City of Knox)	JOB LOCATION: 625 N. Broadway	DAY: Fri

TYPE OF WORK / CIRCLE ONE ASBESTOS (E) INSULATION LEAD INDUSTRIAL CONSULTING

Employee Role: Worker

EMPLOYEE NAME	IN	OUT	IN	OUT	# of Hours	Employee#	Dept Code	Phase Code	Per Diem
1. Yessica Ortiz	7:00	11:30	12	5:30	10		7	200	
2. Manuel Cruz	7:00	11:30	12	5:30	10		7	200	
3. Leyda Ransuary	7:00	11:30	12	5:30	10		7	200	
4. Michel Rodriguez	7:00	11:30	12	5:30	10		7	200	
5. Luis Del Llano SR.	7:00	11:30	12	5:30	10		7	200	
6. Luis Del Llano JR.	7:00	11:30	12	5:30	10		7	200	
7.									
8.									
9.									
10.									
11.									
12.					60				

Summary of Work Completed Today/Special Events/Etc.

Accidents Today? (circle one) Yes (No) **If yes, explain above**

Visitors Today

Name/Company	Name Company
1.	3.
2.	4.

S&ME Inc. – City of Knoxville
Knoxville, TN

Asbestos Abatement Final Submittal

Contents

NEO CORPORATION

Environmental Services Division

ASBESTOS MONITORING DATA

Location: 625 N. Broadway Knoxville TN

Date: 12-18-17

Job #: 7-30043-07

Supv: Mike Robinson

[✓] PERSONAL, [ ] AREA, [ ] CLEARANCE SAMPLES

EMPLOYEE'S NAME: Yessica Ortiz SS#: 3393

RESPIRATOR: [ ] no, [ ] ½-face, [✓] full-face, [ ] supplied-air TYPE: P100

DISPOSABLE COVERALLS: [ ] no, [✓] yes OTHER:

WORK or AREA MONITORED: TSI, Floor tile & Mastic

WORK/AREAS/EMPLOYEES REPRESENTED: Mike Robinson, Yessica Ortiz Luis del Llano Sr., Luis del Llano JR., Herson Garcia

CALIBRATION (with filter in-line):

[ ] Rotameter s/n: 805 [ ] Electronic bubble meter s/n:

FLOW RATE before 2.0 l/min, after 2.0 l/min (use lower flow rate to calculate volume)

SAMPLING PUMP:

Type: BDX II

s/n: 2075

Mixed cellulose ester membrane filters were used in inverted open-face 25-mm cassettes with 50-mm extension cowls. Samples were collected and analyzed in accordance with the OSHA Reference Method (personal samples) or NIOSH Method 7400 (area samples).

Flow Rate Before	Flow Rate After	Laboratory Number	Sample Number	Start Time	Stop Time	Sample Time	Sample Volume	Activity	Result fibers/cc
2.0	2.0		703	7:00	7:30	30	60	3	0.045
2.0	2.0		704	7:30	5:30	600	1200	3	0.022
			TWA = 0.006			f/cc			

WORK HISTORY/REMARKS/AREA SAMPLE PLACEMENT: Removal of TSI & floor tile under neg pressure with wet Method

All samples taken in Direct Breathing Zone of worker

Signature:

Analyst/Laboratory:

NEO Analyst Page Number:

AMD 1.1 (3/30/90)

1. Site Preparation 2. Removal, nonfriable ACM 3. Removal, architectural finish or fireproofing 4. Removal, pipe/fitting insulation
5. Removal, boiler/tank insulation 6. Encapsulation of pipe or boiler insulation 7. Gross debris clean-up 8. Fine cleaning
9. Cleaning critical barrier 10. Removing decontamination unit 11. Loading bags 12. Disposal at landfill

WHITE - Personnel File YELLOW - Job File PINK - Supervisor

NEO CORPORATION

ASBESTOS MONITORING DATA

Environmental Services Division

Location: 625 N Broadway Knoxville TN

Date: 12-19-17

Job #: 7-30043-07

Supv: Mike Robinson

[✓] PERSONAL, [ ] AREA, [ ] CLEARANCE SAMPLES

EMPLOYEE'S NAME: Manuel Cruz

SS#: 6143

RESPIRATOR: [ ] no, [ ] ½-face, [✓] full-face, [ ] supplied-air TYPE:

DISPOSABLE COVERALLS: [ ] no, [✓] yes OTHER:

WORK or AREA MONITORED: TSI, floor tile & Mastic

WORK/AREAS/EMPLOYEES REPRESENTED: Mike Robinson, Scott Trentham Yessica Ortiz, Manuel Cruz, Leyda Ramsury

CALIBRATION (with filter in-line):

[ ] Rotameter s/n: 805 [ ] Electronic bubble meter s/n:

FLOW RATE before 2.0 1/min, after 2.0 1/min (use lower flow rate to calculate volume)

SAMPLING PUMP:

Type: BDXII

s/n: 2075

Mixed cellulose ester membrane filters were used in inverted open-face 25-mm cassettes with 50-mm extension cowls. Samples were collected and analyzed in accordance with the OSHA Reference Method (personal samples) or NIOSH Method 7400 (area samples).

Flow Rate Before	Flow Rate After	Laboratory Number	Sample Number	Start Time	Stop Time	Sample Time	Sample Volume	Activity	Result fibers/cc
2.0	2.0		705	7:00	7:30	30	60	3	0.045
2.0	2.0		706	7:30	5:30	600	1200	3	0.0022
			TWA = 0.006 f/cc						

WORK HISTORY/REMARKS/AREA SAMPLE PLACEMENT: Removal of floor tile on 1st floor Bathrooms & TSI in Basement on Northeast side Double bag Under neg pressure with wet Method

All samples taken in Direct Breathing Zone of worker

Signature:

Analyst/Laboratory:

NEO Analyst Page Number:

AMD 1.1 (3/30/90)

1. Site Preparation 2. Removal, nonfriable ACM 3. Removal, architectural finish or fireproofing 4. Removal, pipe/fitting insulation
5. Removal, boiler/tank insulation 6. Encapsulation of pipe or boiler insulation 7. Gross debris clean-up 8. Fine cleaning
9. Cleaning critical barrier 10. Removing decontamination unit 11. Loading bags 12. Disposal at landfill

WHITE - Personnel File YELLOW - Job File PINK - Supervisor

NEO CORPORATION

ASBESTOS MONITORING DATA

Environmental Services Division

Location: 625 N. Broadway Knoxville TN

Date: 12-20-17

Job #: 7-30043-07

Supv: Mike Robinson

[✓] PERSONAL, [ ] AREA, [ ] CLEARANCE SAMPLES

EMPLOYEE'S NAME: Manuel Cruz

SS#: 6143

RESPIRATOR: [ ] no, [ ] ½-face, [✓] full-face, [ ] supplied-air TYPE: P100

DISPOSABLE COVERALLS: [ ] no, [✓] yes OTHER:

WORK or AREA MONITORED: TSI + floor tile

WORK/AREAS/EMPLOYEES REPRESENTED: Mike Robinson, Scott Trentham Jessica Ortiz, Manuel Cruz, Ceyda Ransway

CALIBRATION (with filter in-line):

[ ] Rotameter s/n: 605 [ ] Electronic bubble meter s/n:

FLOW RATE before 2.0 l/min, after 2.0 l/min (use lower flow rate to calculate volume)

SAMPLING PUMP:

Type: BDX II

s/n: 2075

Mixed cellulose ester membrane filters were used in inverted open-face 25-mm cassettes with 50-mm extension cowls. Samples were collected and analyzed in accordance with the OSHA Reference Method (personal samples) or NIOSH Method 7400 (area samples).

Flow Rate Before	Flow Rate After	Laboratory Number	Sample Number	Start Time	Stop Time	Sample Time	Sample Volume	Activity	Result fibers/cc
2.0	2.0		707	7:00	7:30	30	60	3	0.045
2.0	2.0		708	7:30	5:30	600	1200	3	0.0022
			TWA = 0.006 f/cc						

WORK HISTORY/REMARKS/AREA SAMPLE PLACEMENT: Removal of TSI on Southwest side under low pressure with wet Method

All Samples taken in Direct Breathing Zone of worker

Signature:

Analyst/Laboratory:

NEO Analyst Page Number:

AMD 1.1 (3/30/90)

1. Site Preparation 2. Removal, nonfriable ACM 3. Removal, architectural finish or fireproofing 4. Removal, pipe/fitting insulation
5. Removal, boiler/tank insulation 6. Encapsulation of pipe or boiler insulation 7. Gross debris clean-up 8. Fine cleaning
9. Cleaning critical barrier 10. Removing decontamination unit 11. Loading bags 12. Disposal at landfill

WHITE - Personnel File YELLOW - Job File PINK - Supervisor

NEO CORPORATION

ASBESTOS MONITORING DATA

Environmental Services Division

Location: 625 N Broadway Knoxville TN

Date: 12-21-17

Job #: 7-30043-07

Supv: Mike Robinson

[✓] PERSONAL, [ ] AREA, [ ] CLEARANCE SAMPLES

EMPLOYEE'S NAME: Yessicaortiz

SS#: 3393

RESPIRATOR: [ ] no, [ ] ½-face, [✓] full-face, [ ] supplied-air TYPE: P100

DISPOSABLE COVERALLS: [ ] no, [✓] yes OTHER:

WORK or AREA MONITORED: TSI

WORK/AREAS/EMPLOYEES REPRESENTED: Mike Robinsia, Yessicaortiz Francisco Manio, Luis Del Llano SR. Luis Del Llano SR.

CALIBRATION (with filter in-line):

[ ] Rotameter s/n: 805 [ ] Electronic bubble meter s/n:

FLOW RATE before 2.0 l/min, after 2.0 l/min (use lower flow rate to calculate volume)

SAMPLING PUMP:

Type: BDX II

s/n: 2075

Mixed cellulose ester membrane filters were used in inverted open-face 25-mm cassettes with 50-mm extension cowls. Samples were collected and analyzed in accordance with the OSHA Reference Method (personal samples) or NIOSH Method 7400 (area samples).

Flow Rate Before	Flow Rate After	Laboratory Number	Sample Number	Start Time	Stop Time	Sample Time	Sample Volume	Activity	Result fibers/cc
2.0	2.0		709	7:00	7:30	30	60	3	0.045
2.0	2.0		710	7:30	5:30	600	1200	3	0.0022
			TWA=	0.006	f/cc				

WORK HISTORY/REMARKS/AREA SAMPLE PLACEMENT: Removal of Transit Doors & TSI Under Vac pressure with wet Method

All Sample taken in Direct Breathing zone of worker

Signature:

Analyst/Laboratory:

NEO Analyst Page Number:

AMD 1.1 (3/30/90)

1. Site Preparation 2. Removal, nonfriable ACM 3. Removal, architectural finish or fireproofing 4. Removal, pipe/fitting insulation
5. Removal, boiler/tank insulation 6. Encapsulation of pipe or boiler insulation 7. Gross debris clean-up 8. Fine cleaning
9. Cleaning critical barrier 10. Removing decontamination unit 11. Loading bags 12. Disposal at landfill

WHITE - Personnel File YELLOW - Job File PINK - Supervisor

Airborne Fiber Analysis

By Phase Contrast Microscopy
NIOSH 7400, Issue 2, (A Counting Rules)

Customer: NEO Corporation
289 Silkwood Dr.
Canton, NC 28716

Attn: Lauren Armeni

Project: 7-30043-07

Lab Order ID: 1727493
Analysis ID: 1727493_PCM
Date Received: 12/27/2017
Date Reported: 12/29/2017

Sample ID / *Lab Sample ID*	Description / *Lab Notes*	Volume / *Filter Area*	Fibers / Fields	Filter (Fibers / mm²)	LOD (Fibers / cc)	Conc. (Fibers / cc)
703 / *1727493PCM_1*	Breathing zone	60 L / *385 mm 2*	< 5.5 / 100	< 7.0	0.045	**< 0.045**
704 / *1727493PCM_2*	Breathing zone	1200 L / *385 mm 2*	< 5.5 / 100	< 7.0	0.0022	**< 0.0022**
705 / *1727493PCM_3*	Breathing zone	60 L / *385 mm 2*	< 5.5 / 100	< 7.0	0.045	**< 0.045**
706 / *1727493PCM_4*	Breathing zone	1200 L / *385 mm 2*	< 5.5 / 100	< 7.0	0.0022	**< 0.0022**
707 / *1727493PCM_5*	Breathing zone	60 L / *385 mm 2*	< 5.5 / 100	< 7.0	0.045	**< 0.045**
708 / *1727493PCM_6*	Breathing zone	1200 L / *385 mm 2*	< 5.5 / 100	< 7.0	0.0022	**< 0.0022**
709 / *1727493PCM_7*	Breathing zone	60 L / *385 mm 2*	< 5.5 / 100	< 7.0	0.045	**< 0.045**
710 / *1727493PCM_8*	Breathing zone	1200 L / *385 mm 2*	< 5.5 / 100	< 7.0	0.0022	**< 0.0022**

Bart Huber (8)
Analyst

Approved Signatory

Scientific Analytical Institute
302-L Pomona Dr. Greensboro, NC 27407
Phone: 336.292.3888 Fax: 336.292.3313
www.sailab.com lab@sailab.com

Lab Use Only
Lab Order ID: 1727493
Client Code: NEO01

Company Contact Information	
Company: NEO Corporation	Contact: Lauren Armeni
Address: 289 Silkwood Dr.	Phone ☐: 828-456-4332
Canton, NC 28716	Fax ☐: 828-456-4216
	Email ☑: Larmeni@neocorporation

Billing/Invoice Information	Turn Around Times	
Company:	90 Min. ☐	48 Hours ☑
Contact:	3 Hours ☐	72 Hours ☐
Address:	6 Hours ☐	96 Hours ☐
	12 Hours ☐	120 Hours ☐
	24 Hours ☐	144 Hours ☐

PO Number: 14818
Project Name/Number: 7-30043-07

Asbestos Test Types	
PLM EPA 600/R-93/116	☐
Positive stop ☐	
PLM Point Count	☐
PCM NIOSH 7400	☑
TEM AHERA	☐
TEM Level II	☐
TEM NIOSH 7402	☐
TEM Bulk Qualitative	☐
TEM Bulk Chatfield	☐
TEM Bulk Quantitative	☐
TEM Wipe ASTM D6480-99	☐
TEM Microvac ASTM D5755-02	☐
TEM Water EPA 100.2	☐
Other:	☐

Sample ID #	Description/Location	Volume/Area	Comments
703	Breathing Zone	60	
704		1200	
705		60	
706		1200	
707		60	
708		1200	
709		60	
710		1200	

Accepted ☑
Rejected ☐

Total # of Samples 8

Relinquished by	Date/Time	Received by	Date/Time
Lauren Armeni	12/26/17	[illegible]	12/27/17 11AM

Page 1 of 1

NEO CORPORATION

ASBESTOS MONITORING DATA

Environmental Services Division

Location: 629 N Broadway Knoxville Tn

Date: 12-26-17

Job #: 7-30093

Supv: Mike Robinson

[x] PERSONAL, [ ] AREA, [ ] CLEARANCE SAMPLES

EMPLOYEE'S NAME: Yessica Ortiz

SS#: 3393

RESPIRATOR: [ ] no, [ ] ½-face, [x] full-face, [ ] supplied-air TYPE: P-100

DISPOSABLE COVERALLS: [ ] no, [x] yes OTHER:

WORK or AREA MONITORED: TSI

WORK/AREAS/EMPLOYEES REPRESENTED: Mike Robinson, Scott Trentham, Yessica Ortiz, Manuel Cruz, Leyda Ramsery

CALIBRATION (with filter in-line):

[ ] Rotameter s/n: 805 [ ] Electronic bubble meter s/n:

FLOW RATE before 2.0 l/min, after 2.0 l/min (use lower flow rate to calculate volume)

SAMPLING PUMP:

Type: BDX II

s/n: 2075

Mixed cellulose ester membrane filters were used in inverted open-face 25-mm cassettes with 50-mm extension cowls. Samples were collected and analyzed in accordance with the OSHA Reference Method (personal samples) or NIOSH Method 7400 (area samples).

Flow Rate Before	Flow Rate After	Laboratory Number	Sample Number	Start Time	Stop Time	Sample Time	Sample Volume	Activity	Result fibers/cc
2.0	2.0		711	7:00	7:30	30	60	3	0.045
2.0	2.0		712	7:30	5:30	600	1200	3	0.0022
			TWA=	0.006 f/cc					

WORK HISTORY/REMARKS/AREA SAMPLE PLACEMENT: Removal of TSI under Neg pressure with wet Method Double Bag fine cleaned HepA Vac and secured area

All samples taken in Direct Breathing zone of worker

Signature:

Analyst/Laboratory:

NEO Analyst Page Number:

AMD 1.1 (3/30/90)

1. Site Preparation 2. Removal, nonfriable ACM 3. Removal, architectural finish or fireproofing 4. Removal, pipe/fitting insulation
5. Removal, boiler/tank insulation 6. Encapsulation of pipe or boiler insulation 7. Gross debris clean-up 8. Fine cleaning
9. Cleaning critical barrier 10. Removing decontamination unit 11. Loading bags 12. Disposal at landfill

WHITE - Personnel File YELLOW - Job File PINK - Supervisor

NEO CORPORATION

ASBESTOS MONITORING DATA

Environmental Services Division

Location: 625 N Broadway Knoxville TN

Date: 12-27-17

Job #: 7-30043-07

Supv: Mike Robinson

[✓] PERSONAL, [ ] AREA, [ ] CLEARANCE SAMPLES

EMPLOYEE'S NAME: Manuel Cruz SS#: 6143

RESPIRATOR: [ ] no, [ ] ½-face, [✓] full-face, [ ] supplied-air TYPE: P100

DISPOSABLE COVERALLS: [ ] no, [✓] yes OTHER:

WORK or AREA MONITORED: TSI

WORK/AREAS/EMPLOYEES REPRESENTED: Mike Robinson, Jessica Ortiz, Manuel Cruz, Leyda Ransvary

CALIBRATION (with filter in-line):

[ ] Rotameter s/n: 805 [ ] Electronic bubble meter s/n:

FLOW RATE before 2.0 l/min, after 2.0 l/min (use lower flow rate to calculate volume)

SAMPLING PUMP:

Type: BDX II

s/n: 2075

Mixed cellulose ester membrane filters were used in inverted open-face 25-mm cassettes with 50-mm extension cowls. Samples were collected and analyzed in accordance with the OSHA Reference Method (personal samples) or NIOSH Method 7400 (area samples).

Flow Rate Before	Flow Rate After	Laboratory Number	Sample Number	Start Time	Stop Time	Sample Time	Sample Volume	Activity	Result fibers/cc
2.0	2.0		713	7:00	7:30	30	60	3	0.045
2.0	2.0		714	7:30	5:30	600	1200	3	0.002
			TWA= 0.006 f/cc						

WORK HISTORY/REMARKS/AREA SAMPLE PLACEMENT: Removal of TSI under negative pressure with wet Method Double bag fine cleaned HepaVac and Secured area

All samples taken in Direct Breathing Zone of worker

Signature:

Analyst/Laboratory:

NEO Analyst Page Number:

AMD 1.1 (3/30/90)

1. Site Preparation 2. Removal, nonfriable ACM 3. Removal, architectural finish or fireproofing 4. Removal, pipe/fitting insulation
5. Removal, boiler/tank insulation 6. Encapsulation of pipe or boiler insulation 7. Gross debris clean-up 8. Fine cleaning
9. Cleaning critical barrier 10. Removing decontamination unit 11. Loading bags 12. Disposal at landfill

WHITE - Personnel File YELLOW - Job File PINK - Supervisor

NEO CORPORATION

ASBESTOS MONITORING DATA

Environmental Services Division

Location: 625 N. Broadway Knoxville TN

Date: 12-28-17

Job #: 7-3009 3-07

Supv: Mike Robinson

[✓] PERSONAL, [ ] AREA, [ ] CLEARANCE SAMPLES

EMPLOYEE'S NAME: Manuel Cruz SS#: 6143

RESPIRATOR: [ ] no, [ ] ½-face, [✓] full-face, [ ] supplied-air TYPE: P-100

DISPOSABLE COVERALLS: [ ] no, [ ] yes OTHER:

WORK or AREA MONITORED: TSI

WORK/AREAS/EMPLOYEES REPRESENTED: Mike Robinson, Yessica Ortiz Manuel Cruz, Leyda Ransaury, Luis Del Llano

CALIBRATION (with filter in-line):

[ ] Rotameter s/n: 805 [ ] Electronic bubble meter s/n:

FLOW RATE before 2.0 1/min, after 2.0 1/min (use lower flow rate to calculate volume)

SAMPLING PUMP:

Type: BDX II

s/n: 2075

Mixed cellulose ester membrane filters were used in inverted open-face 25-mm cassettes with 50-mm extension cowls. Samples were collected and analyzed in accordance with the OSHA Reference Method (personal samples) or NIOSH Method 7400 (area samples).

Flow Rate Before	Flow Rate After	Laboratory Number	Sample Number	Start Time	Stop Time	Sample Time	Sample Volume	Activity	Result fibers/cc
2.0	2.0		715	7:00	7:30	30	60	3	0.045
2.0	2.0		716	7:30	5:30	600	1200	3	0.002
			TWA= 0.006 f/cc						

WORK HISTORY/REMARKS/AREA SAMPLE PLACEMENT: Removal of TSI Fire asbestos Doors, floor tile & Mastic under NEG pressure with wet Method Double bag Fine Cleaned Hepa Vac & Secured area

All samples taken in Direct Breathing Zone of worker

Signature: MR

Analyst/Laboratory:

NEO Analyst Page Number:

AMD 1.1 (3/30/90)

1. Site Preparation 2. Removal, nonfriable ACM 3. Removal, architectural finish or fireproofing 4. Removal, pipe/fitting insulation
5. Removal, boiler/tank insulation 6. Encapsulation of pipe or boiler insulation 7. Gross debris clean-up 8. Fine cleaning
9. Cleaning critical barrier 10. Removing decontamination unit 11. Loading bags 12. Disposal at landfill

WHITE - Personnel File YELLOW - Job File PINK - Supervisor

NEO CORPORATION

ASBESTOS MONITORING DATA

Environmental Services Division

Location: 625 N. Broadway Knoxville TN

Date: 12-29-17

Job #: 7-30043-07

Supv: Mike Robinson

[✓] PERSONAL, [ ] AREA, [ ] CLEARANCE SAMPLES

EMPLOYEE'S NAME: Yessica Ortiz

SS#: 3393

RESPIRATOR: [ ] no, [ ] ½-face, [✓] full-face, [ ] supplied-air TYPE: P100

DISPOSABLE COVERALLS: [ ] no, [✓] yes OTHER:

WORK or AREA MONITORED: TSI

WORK/AREAS/EMPLOYEES REPRESENTED: Mike Robinson, Yessica Ortiz Manuel Cruz, Ceyda Ransveny.

CALIBRATION (with filter in-line):

[ ] Rotameter s/n: 805 [ ] Electronic bubble meter s/n:

FLOW RATE before 2.0 l/min, after 2.0 l/min (use lower flow rate to calculate volume)

SAMPLING PUMP:

Type: BDX II

s/n: 2075

Mixed cellulose ester membrane filters were used in inverted open-face 25-mm cassettes with 50-mm extension cowls. Samples were collected and analyzed in accordance with the OSHA Reference Method (personal samples) or NIOSH Method 7400 (area samples).

Flow Rate Before	Flow Rate After	Laboratory Number	Sample Number	Start Time	Stop Time	Sample Time	Sample Volume	Activity	Result fibers/cc
2.0	2.0		718	7:00	7:30	30	60	3	0.045
2.0	2.0		719	7:30	5:30	600	1200	3	0.0022
			TWA = 0.0006 f/cc						

WORK HISTORY/REMARKS/AREA SAMPLE PLACEMENT: Removal of TSI under Neg pressure with wet Method Double Bag Fine Cleaned HepA vac and Secured area

All Samples Taken in Direct Breathing Zone of worker

Signature: [signature]

Analyst/Laboratory:

NEO Analyst Page Number:

AMD 1.1 (3/30/90)

1. Site Preparation 2. Removal, nonfriable ACM 3. Removal, architectural finish or fireproofing 4. Removal, pipe/fitting insulation
5. Removal, boiler/tank insulation 6. Encapsulation of pipe or boiler insulation 7. Gross debris clean-up 8. Fine cleaning
9. Cleaning critical barrier 10. Removing decontamination unit 11. Loading bags 12. Disposal at landfill

WHITE - Personnel File YELLOW - Job File PINK - Supervisor

Airborne Fiber Analysis

By Phase Contrast Microscopy
NIOSH 7400, Issue 2, (A Counting Rules)

Customer: NEO Corporation
289 Silkwood Dr.
Canton, NC 28716

Attn: Lauren Armeni

Lab Order ID: 1800070
Analysis ID: 1800070_PCM
Date Received: 1/3/2018
Date Reported: 1/4/2018

Project: 7-30043-07

Sample ID / *Lab Sample ID*	Description / *Lab Notes*	Volume / *Filter Area*	Fibers / Fields	Filter (Fibers / mm²)	LOD (Fibers / cc)	Conc. (Fibers / cc)
711 / *1800070PCM_1*	Breathing zone	60 L / *385 mm 2*	< 5.5 / 100	< 7.0	0.045	**< 0.045**
712 / *1800070PCM_2*	Breathing zone	1200 L / *385 mm 2*	< 5.5 / 100	< 7.0	0.0022	**< 0.0022**
713 / *1800070PCM_3*	Breathing zone	60 L / *385 mm 2*	< 5.5 / 100	< 7.0	0.045	**< 0.045**
714 / *1800070PCM_4*	Breathing zone	1200 L / *385 mm 2*	< 5.5 / 100	< 7.0	0.0022	**< 0.0022**
715 / *1800070PCM_5*	Breathing zone	60 L / *385 mm 2*	< 5.5 / 100	< 7.0	0.045	**< 0.045**
716 / *1800070PCM_6*	Breathing zone	1200 L / *385 mm 2*	< 5.5 / 100	< 7.0	0.0022	**< 0.0022**
718 / *1800070PCM_7*	Breathing zone	60 L / *385 mm 2*	< 5.5 / 100	< 7.0	0.045	**< 0.045**
719 / *1800070PCM_8*	Breathing zone	1200 L / *385 mm 2*	< 5.5 / 100	< 7.0	0.0022	**< 0.0022**

Sharon Donald (8)
Analyst

Approved Signatory

Scientific Analytical Institute
302-L Pomona Dr. Greensboro, NC 27407
Phone: 336.292.3888 Fax: 336.292.3313
www.sailab.com lab@sailab.com

Lab Use Only
Lab Order ID: 1800070
Client Code: NEO01

Company Contact Information	
Company: NEO Corporation	Contact: Lauren Armeni
Address: 289 Silkwood Dr.	Phone ☐: 828-456-4332
Canton, NC 28716	Fax ☐: 828-456-4216
	Email ☑: Larmeni@neocorporation

Billing/Invoice Information	Turn Around Times	
Company:	90 Min. ☐	48 Hours ☑
Contact:	3 Hours ☐	72 Hours ☐
Address:	6 Hours ☐	96 Hours ☐
	12 Hours ☐	120 Hours ☐
	24 Hours ☐	144 Hours ☐

Asbestos Test Types	
PLM EPA 600/R-93/116	☐
Positive stop ☐	
PLM Point Count	☐
PCM NIOSH 7400	☑
TEM AHERA	☐
TEM Level II	☐
TEM NIOSH 7402	☐
TEM Bulk Qualitative	☐
TEM Bulk Chatfield	☐
TEM Bulk Quantitative	☐
TEM Wipe ASTM D6480-99	☐
TEM Microvac ASTM D5755-02	☐
TEM Water EPA 100.2	☐
Other:	☐

PO Number: 14826
Project Name/Number: 7-30043-07

Sample ID #	Description/Location	Volume/Area	Comments
711	Breathing Zone	60	
712		1200	
713		60	
714		1200	
715		60	
716		1200	
718		60	
719		1200	

Accepted ☑
Rejected ☐

Total # of Samples 8

Relinquished by	Date/Time	Received by	Date/Time
Lauren Armeni	1-2-18	P Hulley 1/3	930A

S&ME Inc. – City of Knoxville
Knoxville, TN

Asbestos Abatement Final Submittal

Contents

NON-HAZARDOUS SPECIAL WASTE & ASBESTOS MANIFEST

If waste is asbestos waste, complete Sections I, II, III and IV.
If waste is NOT asbestos waste, complete only Sections I, II and III.

No. 065293

Section I GENERATOR (Generator complete all of Section 1)

a. Generator Name: City of Knoxville
b. Generating Location:
c. Address: 625 N. Broadway Knoxville TN 37917
d. Address:
e. Phone No.:
f. Phone No.:

If owner of the generating facility differs from the generator, provide:

g. Owner's Name:
Owner's Phone No.:

I. WCI WASTE CODE: MBL 17-057
Containers

j. Description of Waste : TSI

k. Quantity: Units: No.: TYPE: BA

TYPE
DM - METAL DRUM
DP - PLASTIC DRUM
B - BAG
BA - 6 MIL PLASTIC BAG OR WRAP
T - TRUCK
O - OTHER

UNITS
P - POUNDS
Y - YARDS
M^3 - CUBIC METERS
Y^3 - CUBIC YARDS
O - OTHER

GENERATOR'S CERTIFICATION: I hereby certify that the above named material is not a hazardous waste as defined by 40 CFR Part 261 or any applicable state law, has been properly described, classified and packaged, and is in proper condition for transportation according to applicable regulations. **AND, if the waste is a treatment residue of a previously restricted hazardous waste** subject to the Land Disposal Restrictions, I certify and warrant that the waste has been treated in accordance with the requirements of 40 CFR Part 268 and is no longer a hazardous waste as defined by 40 CFR Part 261.

Mike Robinson — Generator Authorized Agent Name
Signature
12/8/17 — Shipment Date

Section II TRANSPORTER (Generator complete a-d; Transporter I complete e-g; Transporter II complete h-n)

TRANSPORTER I

a.Name: Neo
b. Address: 289 Silkwood Dr Canton NC
c. Driver Name / Title: Mike Robinson (Supervisor) (Print / Type)
d. Phone No.: 8657766885 e. Truck No.:
f. Vehicle License No. / State: NC

Acknowledgement of Receipt of Materials.
g. Driver's Signature
12/8/17 — Shipment Date

TRANSPORTER II

h.Name: Waste Connections
i. Address: Chipman St Knoxville, TN
j. Driver Name / Title: Derek Bays (PRINT / TYPE)
k. Phone No.: l. Truck No.:
m. Vehicle License No. / State: TN

Acknowledgement of Receipt of Materials.
n. Driver's Signature
12/8/17 — Shipment Date

Section III DESTINATION (Generator complete a-d, destination site completes e-f.)

a.Site Name: MBL
b. Physical Address: 233 CR 166 Athens TN 37303
c. Phone No.:
d. Mailing Address:

e. Discrepancy Indication Space:

I hereby certify that the above named material has been accepted and to the best of my knowledge the foregoing is true and accurate.

f. Name of Authorized Agent
Signature
Receipt Date 12/8/17

Section IV ASBESTOS (Generator completes a-d, f, g; Operator * completes e.)

a. Operator's * Name: Neo Corporation
b. Operator's * Phone No.:
c. Operator's * Address 289 Silkwood Dr Canton NC
d. Special handling instructions and additional information:

OPERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked and labeled, and are in all respects in proper condition for transport by highway according to applicable international and government regulations

e. Operator's Name & Title: Mike Robinson (Supervisor) (Print / Type)
Operator's * Signature
12/8/17 — Date

f. Name & address of Responsible Agency:

g. ☒ Friable; ☐ Non-friable; ☐ Both _____ % friable _____ % nonfriable _____

* Operator refers to the company which owns, leases, operates, controls, or supervises the facility being demolished or renovated, or the demolition or renovation operation, or both.

DESTINATION RETAIN

NON-HAZARDOUS SPECIAL WASTE & ASBESTOS MANIFEST

No. 065294

If waste is asbestos waste, complete Sections I, II, III and IV.
If waste is NOT asbestos waste, complete only Sections I, II and III.

Section I GENERATOR (Generator complete all of Section I)

a. Generator Name: City of Knoxville
b. Generating Location:
c. Address: 625 N. Broadway Knoxville TN
d. Address: 625 N. Broadway Knoxville TN
e. Phone No.:
f. Phone No.:
If owner of the generating facility differs from the generator, provide:
g. Owner's Name:
Owner's Phone No.:

l. WCI WASTE CODE: IM 050

Containers

j. Description of Waste: TSI Friable

k. Quantity: 30 Units: No.: TYPE: BA

TYPE
DM - METAL DRUM
DP - PLASTIC DRUM
B - BAG
BA - 6 MIL PLASTIC BAG OR WRAP
T - TRUCK
O - OTHER

UNITS
P - POUNDS
Y - YARDS
M^3 - CUBIC METERS
Y^3 - CUBIC YARDS
O - OTHER

GENERATOR'S CERTIFICATION: I hereby certify that the above named material is not a hazardous waste as defined by 40 CFR Part 261 or any applicable state law, has been properly described, classified and packaged, and is in proper condition for transportation according to applicable regulations. **AND, if the waste is a treatment residue of a previously restricted hazardous waste** subject to the Land Disposal Restrictions, I certify and warrant that the waste has been treated in accordance with the requirements of 40 CFR Part 268 and is no longer a hazardous waste as defined by 40 CFR Part 261.

Mike Robinson — Generator Authorized Agent Name
Signature
12/27/17 — Shipment Date

Section II TRANSPORTER (Generator complete a-d; Transporter I complete e-g; Transporter II complete h-n)

TRANSPORTER I

a. Name: NEO Corporation
b. Address: 289 Silkwood Dr Canton NC
c. Driver Name / Title: Mike Robinson (Supervisor)
d. Phone No.: 865-776-6885
e. Truck No.: P/U 465
f. Vehicle License No. / State: NC
Acknowledgement of Receipt of Materials.
g. Driver's Signature
12/27/17 — Shipment Date

TRANSPORTER II

h. Name: Waste Connections
i. Address: Chipman St Knoxville, TN
j. Driver Name / Title: Derek Bays
k. Phone No.:
l. Truck No.: 465
m. Vehicle License No. / State:
Acknowledgement of Receipt of Materials.
n. Driver's Signature
12/28/17 — Shipment Date

Section III DESTINATION (Generator complete a-d, destination site completes e-f.)

a. Site Name:
b. Physical Address:
c. Phone No.:
d. Mailing Address:
e. Discrepancy Indication Space:
I hereby certify that the above named material has been accepted and to the best of my knowledge the foregoing is true and accurate.
f. Name of Authorized Agent
Signature
12/28/17 — Receipt Date

Section IV ASBESTOS (Generator completes a-d, f, g; Operator * completes e.)

a. Operator's * Name: NEO Corporation
b. Operator's * Phone No.: 865-776-6885
c. Operator's * Address: 289 Silkwood Dr Canton NC
d. Special handling instructions and additional information:

OPERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked and labeled, and are in all respects in proper condition for transport by highway according to applicable international and government regulations

e. Operator's Name & Title: Mike Robinson (Supervisor) — Print / Type
Operator's * Signature
12/27/17 — Date

f. Name & address of Responsible Agency:

g. ☑ Friable; ☐ Non-friable; ☐ Both ____ % friable 100 % nonfriable ____

* Operator refers to the company which owns, leases, operates, controls, or supervises the facility being demolished or renovated, or the demolition or renovation operation, or both.

DESTINATION RETAIN

NON-HAZARDOUS SPECIAL WASTE & ASBESTOS MANIFEST

No. 065295

If waste is asbestos waste, complete Sections I, II, III and IV.
If waste is NOT asbestos waste, complete only Sections I, II and III.

Section I GENERATOR (Generator complete all of Section 1)

a. Generator Name: Stme City of Knoxville
c. Address: 625 N Broadway Knoxville Tn
e. Phone No.:

b. Generating Location: City of Knoxville
d. Address: 625 N. Broadway Knoxville Tn
f. Phone No.:

If owner of the generating facility differs from the generator, provide:
g. Owner's Name:
Owner's Phone No.:

I. WCI WASTE CODE:
Containers:
j. Description of Waste: TSI Friable
k. Quantity: 30Y Units: No.: TYPE: BA

TYPE
DM - METAL DRUM
DP - PLASTIC DRUM
B - BAG
BA - 6 MIL PLASTIC BAG OR WRAP
T - TRUCK
O - OTHER

UNITS
P - POUNDS
Y - YARDS
M^3 - CUBIC METERS
Y^3 - CUBIC YARDS
O - OTHER

GENERATOR'S CERTIFICATION: I hereby certify that the above named material is not a hazardous waste as defined by 40 CFR Part 261 or any applicable state law, has been properly described, classified and packaged, and is in proper condition for transportation according to applicable regulations. **AND, if the waste is a treatment residue of a previously restricted hazardous waste** subject to the Land Disposal Restrictions, I certify and warrant that the waste has been treated in accordance with the requirements of 40 CFR Part 268 and is no longer a hazardous waste as defined by 40 CFR Part 261.

Mike Robinson — Generator Authorized Agent Name (Print / Type)
Signature
Shipment Date: 12/28/17

Section II TRANSPORTER (Generator complete a-d; Transporter I complete e-g; Transporter II complete h-n)

TRANSPORTER I
a. Name: Neo Corporation
b. Address: 289 Silkwood Dr Canton N.C.
c. Driver Name / Title: Mike Robinson (Supervisor) (Print / Type)
d. Phone No.: 865-776-6885 e. Truck No.:
f. Vehicle License No. / State: NC
Acknowledgement of Receipt of Materials.
g. Driver's Signature
Shipment Date: 12/28/17

TRANSPORTER II
h. Name: Waste Connections
i. Address: Chipman St Knoxville, TN
j. Driver Name / Title: Derek Bays (PRINT / TYPE)
k. Phone No.:
l. Truck No.: 465
m. Vehicle License No. / State: TN 08683
Acknowledgement of Receipt of Materials.
n. Driver's Signature
Shipment Date: 12/28/17

Section III DESTINATION (Generator complete a-d, destination site completes e-f.)

a. Site Name: MRL
b. Physical Address: 3300 Rd Memphis TN 38203
c. Phone No.: 745-6396
d. Mailing Address:
e. Discrepancy Indication Space:
I hereby certify that the above named material has been accepted and to the best of my knowledge the foregoing is true and accurate.
f. Name of Authorized Agent
Signature
Receipt Date: 12/28/17

Section IV ASBESTOS (Generator completes a-d, f, g; Operator * completes e.)

a. Operator's * Name: Neo Corporation
b. Operator's * Phone No.:
c. Operator's * Address: 289 Silkwood Dr Canton NC
d. Special handling instructions and additional information:

OPERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked and labeled, and are in all respects in proper condition for transport by highway according to applicable international and government regulations.

e. Operator's Name & Title: Mike Robinson (Supervisor) (Print / Type)
Operator's * Signature
Date: 12/28/17

f. Name & address of Responsible Agency:

g. ☑ Friable; ☐ Non-friable; ☐ Both ____ % friable 100 % nonfriable ____

* Operator refers to the company which owns, leases, operates, controls, or supervises the facility being demolished or renovated, or the demolition or renovation operation, or both.

DESTINATION RETAIN

S&ME Inc. – City of Knoxville
Knoxville, TN

Asbestos Abatement Final Submittal

Contents

NEO CORPORATION

NEO Corporation Certificate of Asbestos Removal

NEO Corporation abated approximately 895 LF of TSI, 1,665 SF of Floor Tile/Mastic, 800 SF of Ceiling Cork Board, and 400 SF of Boiler Wrap at the City Laundry Building at 625 North Broadway Road in Knoxville, Tennessee. NEO Corporation utilized negative pressure, wet glove bag methods, HEPA vacuum, and a prompt clean up. NEO performed a final inspection of the jobsite upon completion, and fine cleaning was performed after the asbestos abatement. All waste was double-bagged and disposed of in an approved landfill for asbestos-containing materials.

All asbestos was removed according to local, state, and federal regulations.

Should you have any questions or require additional information, please contact me at 865-250-9454.

Sincerely,

Neo Corporation

Steve Steele – TN Division Manager

File: 7-30043-07

03014

SHIPPING DOCUMENT
FOR NONHAZARDOUS MATERIAL

• TO BE COMPLETED BY GENERATOR •

Generator Name: Sanitary Laundry Date: 5/11/18

Address: 625 N Broadway St Phone # (____) ____ - ____

Knoxville Tn

DESCRIPTION OF WASTE / MUST CHECK ONE

UST/Gasoline____ UST/Diesel Fuel____ UST/Gasoline, Diesel and Waste Oil Mix____

UST/Waste Oil____ Spill/Gasoline____ Spill/Diesel Fuel____ Spill Waste Oil____

Water/Gas ____ Water/FuelOil ____

Other/Define 3 Solids

This shipment needs to be sampled at Domermuth's Facility ____Yes X No

Quantity (# of tons, drums or gallons)____ Containers (Dump Trucks, Drums or Vac Truck) ____

I hereby certify the above named material is a non-hazardous waste as defined by 40 CFR part 261 or any applicable law, has been properly described, classified & packaged, and is in proper condition for transportation according to applicalbe regulations.

Generator's Signature _____ Date 5/11/18 Time 16:26
(or authorized agent)

• TO BE COMPLETED BY TRANSPORTER •

Transporter Name: DES Vehicle Lic. # ____

Address Rutledge Pk Truck # ____

Knoxville Tn State of Registration ____

I hereby certify the above named material was picked up at the generator site listed above. I hereby certify the above named material was delivered without incident to destination listed below.

Driver's Name (Please Print) GARY GEORGE Date 5/11/18

Signature _____ Time ____

• TO BE COMPLETED BY FACILITY •

Please check one.

☑ **Domermuth Environmental Svcs.**
7826 Rutledge Pike
Knoxville, TN 37924
Phone # (865) 689-1332

☐ **Domermuth Environmental Svcs.**
#1 Mill Pond Rd.
Stearns, Kentucky 42647
Phone # (865) 689-1332

I hereby certify the above named material has been accepted and to the best of my knowledge the foregoing is true and accurate.

Signature _____ Date 5/11/18 Time ____

White & Yellow Copy - TSD Facility Pink Copy - Generator Gold Copy - Transporter

Appendix V- Remedial System Design Information

VAPOR INTRUSION MITIGATION PLAN DESIGN
for:
Former Sanitary Laundry
625 N. Broadway
Knoxville, Tennessee

Prepared for:

Liz Porter, P.G., PMP
Senior Project Manager/Vice President
6515 Nightingale Lane
Knoxville, TN 37909

Prepared by:

Thomas E. Hatton
CEO – Project Director
Clean Vapor, LLC
148 Route 94
P.O. Box 688
Blairstown, NJ 07825

NRPP ID 104705

July 13, 2018

Table of Contents

Front of Building to be Mitigated

1 Introduction

1.1 Background

Clean Vapor, LLC (Clean Vapor) was retained by S&ME to conduct a building investigation, diagnostic testing, and prepare a vapor intrusion mitigation system (VIMS) design for the Former Sanitary Laundry at 625 N. Broadway located in Knoxville, Tennessee. The building area of concern measures approximately 15,000 square feet. From June 11 to June 12, 2018, sub slab pressure field extension testing was conducted.

The proposed VIMS has been designed to create a negative pressure field (relative to typical building pressures at the time of diagnostic testing and under reasonably anticipated future re-development scenarios) under the slab of the building, in the areas identified in Figure 1.2, so that sub slab vapors will be unlikely to migrate upward into the building. Clean Vapor's design consists of specifications and drawings that provide details for construction of a Sub Slab Depressurization System (SSDS). If installed, operated and maintained per specifications, the SSDS will be able to maintain negative sub slab pressures under reasonably anticipated conditions and prevent soil vapors from entering the building. The goal of the system is to create a sub slab negative pressure field of -0.004 to -0.008 inches of water column ("w.c.) with a minimum vacuum field of -0.004"w.c. at the outer extent of the negative pressure field during adverse conditions.

The design presented herein is based on complete depressurization of the entire 15,000 square foot surface. The building is a historic two-story brick structure that is classified as a city landmark and currently part of an environmental cleanup grant. The ground floor level is slab on grade. The second floor is structural concrete and is supported by concrete columns and beams. Concurrent with the cleanup grant activities, the roof has been renovated by the city.

1.2 Building Slabs

The area of focus consists of three (3) slab areas, the main slab, the ramp area, and the lower slab where the dry-cleaning vessels are located. Diagnostic testing determined that two (2) soil depressurization systems would mitigate the targeted slab areas.

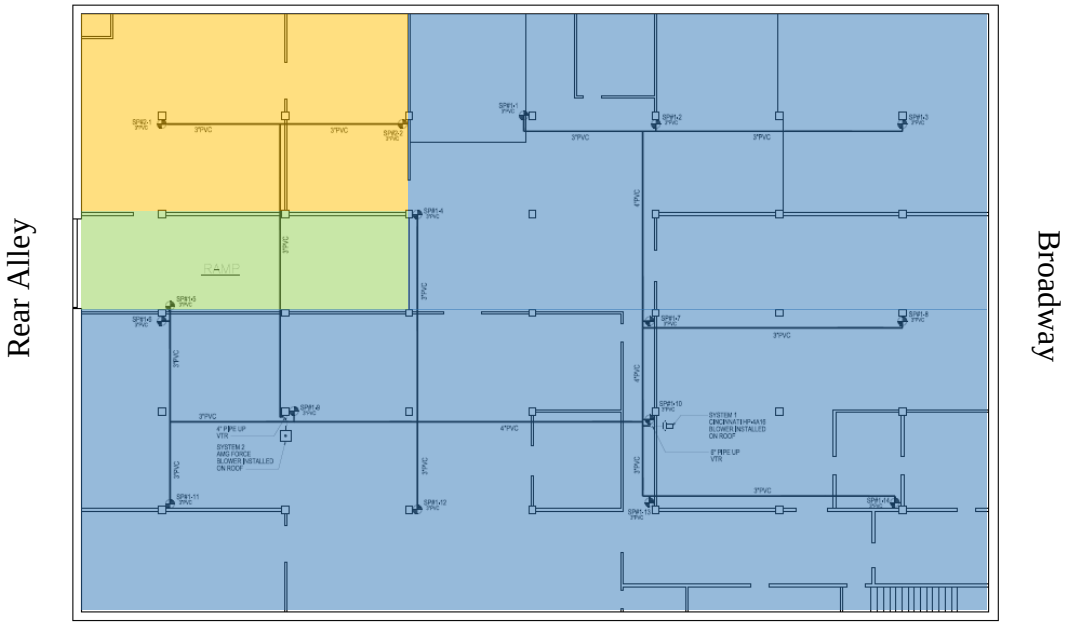


Figure 1.2 Subject Building

2 Diagnostics

2.1 Diagnostic Procedures

In accordance with the accepted design proposal and plan for diagnostics dated April 26, 2018, a building investigation and diagnostic testing were performed between June 11 and June 12, 2018. Four (4) 2 5/8-inch diagnostic suction hole(s) were drilled throughout the building. A calibrated shop vacuum was used to apply vacuum to the sub slab material to simulate vacuum fields. Smaller test holes were drilled on an x and y axis throughout the areas within the suction holes' radii of influence. The motor speed of the vacuum was varied to develop a performance curve that would enable us to project the radius of influence and airflow characteristics of different blowers.

On the day that sub slab pressure field extension testing occurred, indoor to outdoor pressure differential measurements were not taken due to the open condition of the building. This process would normally determine if the pressure differentials would be a significant contributing factor that would influence the operational range of blowers selected. The weather on June 12, 2018, the day the sub slab vacuum field testing occurred, was mostly cloudy, 77º F, winds 6 mph (SW), barometer 30.01″ Hg, and humidity 75 percent. Both the open condition of the building due to broken windows and similar indoor to outdoor temperatures are factors that contributed to the near neutral pressure condition that existed between the underlying soil and the interior of the building at the time of pressure field extension testing. Based on an assumed 70° indoor temperature after

renovation and historic seasonal outdoor temperatures, reserve capacity was built into the blowers selected.

Static vacuum and airflow measurements were conducted at the suction holes. A micro-manometer was used to measure pressure differentials at the remote test holes. A vane anemometer was used to measure airflow that was yielded from the sub slab. The acquired data has been interpolated to make reasonable assumptions to predict pressure field extension and airflow. Baseline pressure differential measurements were collected to establish building pressures relative to the sub slab material. The pressure differentials, which are the driving force that induces vapor intrusion, are always greater during the heating season as compared to the summer and can be as much as one order of magnitude greater than what was measured during the time of our investigation. For example, the sub slab baseline pressure differentials measured at the time of our investigation were in the thousands to ten thousandths inch of water column range. During the heating season it is anticipated that these pressure differentials would be in the hundredths to thousandths inch of water column range. These differences in pressure is a common occurrence and is accounted for in the blowers selected.

The results of vacuum field extension testing are shown in the Diagnostic Data Section of this report. Pictures of the vacuum field extension testing being performed can also be seen in the Pictures section and relevant points from testing are shown on a sheet in the attached drawings.

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2.2 Diagnostic Data

Below is the test data from the four (4) areas where sub slab pressure differentials were recorded. The values below indicate that the baseline sub slab pressure is positive and poses a vapor intrusion risk. The locations at which these measurements were made can be found on the Diagnostic Test Hole Sheet 1. All distances are in feet and vacuum measurements in inches of water column.

2.2.1. Test Suction Point #1

Vacuum Applied ("wc):		Baseline	21	11	5
Airflow (cfm):		-	76	53	33
Test Hole #	**Distance (ft.)**				
V1	1	0.0004	-10.31	-5.7	-3.08
V2	5	0.0004	-0.2437	-0.128	-0.0564
1	10	0.0003	-0.4550	-0.2440	-0.1143
2	20	0.0005	-0.0009	-0.0005	N.C.
3	30	0.0004	-0.0006	0.0012	N.C.
4	36	0.0005	-0.0001	0.0050	N.C.
5	10	0.0004	-1.0990	-0.4890	-0.2250
6	20	0.0002	-0.2090	-0.0914	-0.0332
7	30	0.0005	-0.0191	-0.0120	-0.0050
8	40	-0.0015	-0.0012	-0.0027	-0.0023
9	50	-0.0006	-0.0005	-0.0080	-0.0012
10	10	0.0007	-1.0060	-0.5470	-0.2650
11	20	0.0005	-0.2730	-0.1341	-0.0622
12	30	0.0006	-0.2190	-0.1065	-0.0485
13	40	0.0008	-0.0502	-0.0180	-0.0093
14	50	0.0002	-0.0062	-0.0027	-0.0012
15	10	0.0011	-1.0430	-0.0559	-0.0253
16	20	0.0005	-0.0376	-0.0202	-0.0098
17	30	0.0008	-0.0172	-0.0091	-0.0041
18	40	0.0007	-0.0123	-0.0057	-0.0020
19	50	0.0006	-0.0107	-0.0043	-0.0027

2.2.2. Test Suction Point #2

Vacuum Applied ("wc):	Baseline	32	16	8
Airflow (cfm):	-	24	20	10

Test Hole #	Distance (ft.)				
V3	1	0.0002	-24.17	-11.72	-6.06
V4	5	0.013	-5.03	-3.31	-2.05
13	8	0.0008	-3.9900	-1.5730	-0.9160
12	18	0.0006	-0.3120	-0.1787	-0.0958
11	28	0.0005	-0.0872	-0.0495	-0.0258
10	38	0.0007	-0.0225	-0.0120	-0.0061
20	10	0.0004	-0.3510	-0.1962	-0.1036
21	20	0.0004	-0.0773	-0.0376	-0.0194
22	30	0.0006	-0.0169	-0.0087	-0.0046
23	40	0.0003	-0.0062	-0.0025	-0.0009
24	50	0.0003	-0.0017	-0.0006	0.0001
25	10	0.0006	-0.0776	-0.0306	-0.0162
26	10	0.0015	-1.4360	-0.8625	-0.3310
27	20	0.0022	-0.0931	-0.0592	-0.0331
28	30	0.0013	-0.0087	-0.0030	-0.0040
29	40	0.0005	-0.0010	-0.0005	0.0001
30	50	0.0002	0.0004	0.0003	0.0002

2.2.3. Test Suction Point #3

Vacuum Applied ("wc):	Baseline	8	6	4
Airflow (cfm):	-	117	102	74

Test Hole #	Distance (ft.)				
V5	1	0.0006	-2.62	-2.09	-1.50
V6	5	0.0005	-0.97	-0.79	-0.59
31	10	0.0011	-0.6411	-0.5301	-0.3890
32	10	0.0001	-0.5482	-0.4401	-0.3280
33	20	0.0011	-0.1428	-0.1314	-0.0999
34	30	0.0011	0.0004	0.0001	0.0001
35	24	0.0007	-0.3738	-0.1580	-0.1857
36	33	0.0014	-0.0120	-0.0105	-0.0078
37	10	0.0007	-0.8540	-0.6872	-0.5112
38	17	0.0004	-0.7512	-0.6041	-0.4557
39	24	-0.0004	-0.3076	-0.2502	-0.1776
40	10	0.0001	-0.4635	-0.3843	-0.2782
41	17	-0.0008	-0.1319	-0.1153	-0.0836

2.2.4. Test Suction Point #4

Vacuum Applied ("wc):	Baseline	39	20	10
Airflow (cfm):	-	21	20	15

Test Hole #	Distance (ft.)				
V7	1	0.0005	-4.62	-2.66	-1.56
V8	5	0.0004	-2.12	-1.23	-0.72
42	7	0.0001	-1.2660	-0.7383	-0.4759
43	17	-0.0001	-0.5508	-0.3388	-0.2106
44	24	0.0001	-0.3821	-0.2325	-0.1429
45	33	0.0001	-0.1555	-0.094	-0.0584
46	13	0.0006	-0.3787	-0.2595	-0.1395
47	23	-0.0016	-0.2503	-0.1493	-0.0933
48	10	0.0006	-1.0284	-0.5965	-0.3601
49	20	0.0007	0.0008	0.002	0.0007
50	10	0.0003	-0.4103	-0.2443	-0.1662
51	20	0.0017	-0.0038	-0.0024	-0.0012
52	30	0.0005	-0.0002	-0.0011	0.0004
53	40	0.0027	-0.0006	-0.0013	0.0004
54	30	0.0011	-0.0126	-0.0098	-0.0057
55	24	0.0001	-0.0126	-0.0071	-0.0031
56	24	-0.0004	-0.1640	-0.1008	-0.0601
57	38	0.0002	-0.0029	-0.0012	-0.0008
58	47	0.0001	-0.0030	-0.0011	-0.0001

2.3 Interpretation of Diagnostics

Vacuum fields were determined by evaluating the results of the negative pressure field testing. The overall vacuum field extension testing provided data that could be used to develop a model capable of projecting a negative pressure field that will prevent the upward migration of soil gases into the occupied space.

Analysis of the diagnostic data revealed varying permeability in the fill material which is beneath the individual slabs. When vacuum was applied, these soils measured different vacuum field extensions in each section of the building.

It should be noted that if any portion of the floor is cut and opened during the fit out for the installation of sub grade utilities, such as waste lines or grease traps, that those areas shall be back filled with crushed stone. Under no circumstances shall sub surface utilities be backfilled with compacted or lower permeable fill material.

2.4 Blower Selection and Suction Point Locations

Blowers and suction points have been selected and specified based on the volume of air yield, static pressure readings, and measured vacuum field extension recorded during the diagnostic

testing. The design objective is to create a negative pressure field of -0.004 to -0.008"w.c. with a minimum vacuum field of -0.004"w.c at the outer extent of the negative pressure field during adverse pressure conditions. Pressure field projections are adjusted to accommodate anticipated field installation conditions. For example, when removing one cubic foot of soil under the slab, the static pressure can drop 20% and the volume of air increase subject to the limitations of the soil and blower. The radius of the negative pressure field beneath the slab may also increase. Since variability in soils and permeability exist beneath the slab, the projected radius is not based on a pure mathematical extrapolation but a total approach that includes the aforementioned conditions. An examination of the soil matrix, sub slab permeability mapping data, and experience factors are all considered when developing these projections. The graph and table located in Appendix B, Equipment Cut Sheets, depicts the blower curve for the fans to be installed at the site.

3 System Design and Installation

3.1 System Layout

There will be two (2) mitigation systems installed. The table below displays the targeted applied vacuum and projected soil airflow yields to meet minimum pressure field requirements.

System #	Fan Model	Applied Vacuum ("w.c.)	Projected Airflow (cfm)	# of Suction Points	Building Section
1	Cincinnati Fan HP-4A16	12	310	14	Upper Slab
2	Force Blower	3.5	110	2	Lower Slab

3.2 Suction Holes

A total of sixteen (16) suction points will be installed. See Drawing Sheet 3 for the locations of suction points, mitigation piping and blower locations. To enhance the vacuum field distribution and limit any disruption to building use, the suction points will be located near existing walls and on structural columns. The specific location of the suction points shall be agreed upon by Clean Vapor and the building owner's representative prior to installation. When drilling suction points, the procedures listed in the General Installation section shall be followed to minimize damaging any sub slab utilities. Once the suction point has been developed and sealed, vacuum should be applied to the suction point using a calibrated shop vacuum with the same performance as the shop vacuum used during diagnostics.

In some cases, column pads may come up to the bottom of the slab. When this occurs, there will be a need to have the suction point just off to the side of the column pad. Connecting the riser pipe with the suction point will require an elongated oval to be cut in the concrete to overcome this

condition. The riser will be clamped into the "I" pocket of the column with a lateral section of pipe to connect the riser and the suction point which will be below the floor level at the edge of the column pad. Once completed, a three-step process will be implemented to assure that the suction point is sealed gas tight. The process will require installing a base level of backer rod and concrete followed by an application of urethane-based sealants and a top level of concrete that will be flush with the level of the existing floor. There is a detail on Sheet 4 that illustrates an off-footer suction point.

S&ME, or building owner is responsible for soil testing and disposal. It is estimated that five (5) 55 gallon drums will be required for disposal of the soil and two (2) 55 gallon drums for concrete cores and cuttings associated with suction point development.

3.3 System Piping

All horizontal pipe runs between the fans and the first suction point will be installed with one-inch slope back to a suction point for each ten feet of horizontal pipe run. All vertical pipe runs will be installed plumb. All horizontal runs after the first suction point may be run level. However, in no case will the piping be installed to create a possible water trap in the piping. All piping and fittings installed, unless otherwise noted or specified, shall be steel, electrical conduit or no hub cast iron and banded couplers.

Steel risers and electrical conduit pipe will be supported at least every six feet of horizontal run and at least every ten feet of vertical run. Suction point riser pipes will be secured to the wall or column adjacent to the suction point. Conduit channel with pipe clamps can also be used to support pipe routed along the ceiling or walls. Pipe cannot be supported by other building piping or ducts. Swivel ring or standard bolt-type clevis will be used to support pipe.

It is anticipated that there will be a need to balance airflow and equalize the distribution vacuum throughout the system. Inline gate valves shall be installed in each suction point riser pipe. This will also enable the select suction point to be throttled down or shut off if it is determined that the associated areas of influence are no longer yielding contaminant soil vapors.

3.4 Blower Installation and Start Up

There will be a total of two (2) mitigation blowers installed on the roof of the building. The locations of the blowers are indicated on the attached drawings and a typical photo example can be seen in the Pictures Section. The blowers were specified based on diagnostic vacuum distribution and airflow measurements as discussed earlier. When soil is removed from the suction point, solution channels that were not detected during the diagnostic phase are sometimes discovered. This can result in greater than expected airflow and decreased static vacuum. It cannot be projected if or when this may occur, but when it does, it is considered to be good because it can allow the consultant the opportunity to specify a lower vacuum and horsepower blower which

results in the motor operating at greater efficiency and under less load. After the suction points have been developed, they shall be individually tested using a vapor blower or calibrated vacuum to simulate the vacuum to be applied by the permanent blower. This should be done before the permanent blower is mounted to the stand for final activation. Static vacuum, airflow and the pressure differential at a temporary floor port shall be measured. This procedure and the interpretation of the data should be done by a person who is experienced and skilled in the art of evaluating suction point data and selecting blowers for optimal performance and energy efficiency.

For load distribution, the roof mounted blowers will be located directly above, or as close as possible, to roof trusses and support columns. The location and blower type are noted by a symbol in the System Drawing. The blower exhaust will be a minimum of two feet above the roofline. The blower exhaust will be a minimum of twenty feet from windows, doors, air intakes, passive relief vents or any other openings in the building that cannot be easily repaired. If radial blower discharge noise is determined to be unacceptable, sound attenuation devices are available. The final location of each blower will be field verified by the installation contractor and approved by the owner prior to installation.

3.5 Sealing

3.5.1 Cracks and Joints

Any visible expansion joints or slab cracks in the area being mitigated that have a 1/16 inch or greater opening will be sealed. Cracks will be cleaned with a walk behind rotary wheel device with a vacuum attachment to capture dust or debris. Cracks that are from concrete faults and identified expansion joints will be channel key cut prior to sealing using a crack saw fitted with a dust collecting device. Cracks will be sealed with a gun-grade urethane caulk sealant. Any openings into the slab, such as those that may occur around conduit pipe penetrations through the slab, will be cleaned and sealed with gun-grade urethane caulk. Expansion joints that are greater than ¼ inch in width or greater than 3/8 inch below the floor surface may require the installation of backer rod and self-leveling urethane sealant. All sealed floor cracks should be noted on the As Built drawing. The sealing within and surrounding an individual blower system area shall be completed prior to vacuum testing the suction points within a system.

3.5.2 Open Slab Areas

There are multiple exposed soil areas where concrete floor patching will be required. The repaired slab section should have an underlying polyethylene vapor barrier and a minimum four (4) inches of concrete.

3.5.3 Open Pits

There are three (3) areas in the slab where a section of the slab was removed, and the soil was excavated down two to three feet. The open cavities shall be filled with crushed stone and polyethylene vapor barrier installed just below the level of the existing slab. A minimum of four (4) inches of concrete shall be installed flush with the existing slab.

3.5.4 Open Pipes and Conduits

There are several open pipes and conduits, shown in the drawings, that are abandoned from previous operations. These are potential soil gas entry points that shall be addressed by evaluating the current use status and capping with concrete or urethane-based sealants as required.

3.6 Blower Wiring

Dedicated breakers shall be used for the mitigation blowers. This will prevent the blowers from being shut off when a circuit is powered down for an unrelated function. Based on the blower amperage requirements, a licensed electrician will determine the load for each circuit. The panel location and breaker number will be referenced in the final report and on the system labels. Because of the amperage requirements, a metered sub panel may be required for accuracy and ease of billing. The panel selected shall be identified and approved by the building owner. Electric panel locations, wire runs and breaker numbers shall be noted on the As Built Electrical Drawing and included in the final commissioning report.

Electrical service and a breaker panel shall be installed by the owner prior to installation of the system.

3.7 Variable Frequency Drives

The radial blowers to be installed will be equipped with Variable Frequency Drives (VFD). The installation of a VFD allows us to tune the radial blower's performance to apply the most effective and efficient vacuum to the suction points in the system. The VFDs also allow for an incremental and even distribution of voltage during start up or in the event of a power outage. The VFD will be integrated into the dynamic control and management system and, through a control logic system, will actively manage the speed of the blowers to ensure that the specified vacuum fields are maintained. The management system also provides for onsite and offsite blower control.

3.8 Vacuum Indicators

Magnehelics will be installed to indicate the static vacuum generated by each system. To the extent practicable, the range of the Magnehelics will be selected so that the indicator needle is close to or just to the right of center on the dial face. The Magnehelics shall be enclosed in protective enclosures. The low pressure Magnehelic port will be connected with 1/4" O.D. rigid polyethylene tubing to a common conveyance pipe in the system. The polyethylene tubing should

arc to a higher elevation than where it exits the riser pipe before it is connected with the Magnehelics. This will prevent condensation from running into the Magnehelics or creating a water trap in the tube. Exposed sections of tubing that run down from overhead will be enclosed in rigid conduit. Because of the size of the building and recognizing that other sections of this building may be mitigated in the future, to the extent possible, Magnehelics should be grouped into local panels with a maximum of four Magnehelic gauges in each panel. The exact location of the Magnehelic panels is at the discretion of Clean Vapor, and the Owner and should be noted in the final system As-Built drawings.

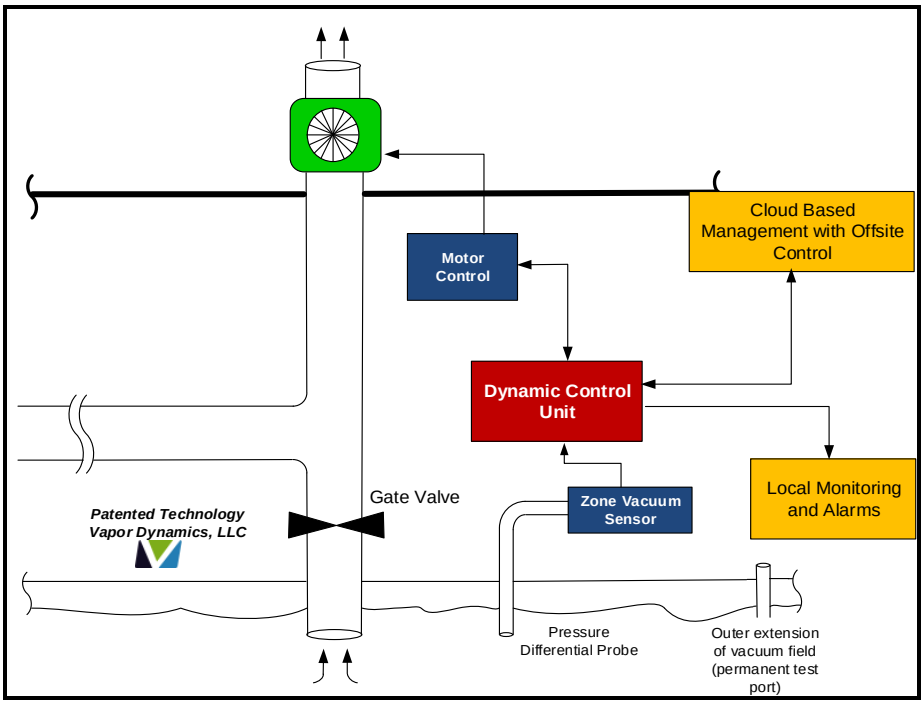
3.9 Vapor Guardian 5500 Monitoring and Controls

Clean Vapor is a certified installer of the Vapor Dynamics, LLC Vapor Guardian 5500™ monitoring and controls panel. This panel offers the owner and consultant the ability to remotely monitor the performance the VIMS including sub slab pressure differentials, static system vacuum, and power consumption. This feature will ensure that sub slab vacuum levels are not breached thus creating a potential sub slab vapor pathway. Since mitigation of this building section is anticipated to be part of a larger mitigation project it would be a sound practice to have the entire property under the surveillance of one monitoring and control system. The best time to install these components is during the fit-out process.

The Vapor Guardian 5500™ will electronically notify the consultant in the event of a system parameter fault. Electronic notifications can be triggered based on sub slab or system static vacuum set points. The system integrates the use of a 4G Verizon modem for control and data monitoring. If sufficient signal strength is not achieved at the location of the transmitter, a roof mounted antenna, which is approximately 12 inches tall, may need to be installed. The exact location of the monitoring hardware is at the discretion of installation contractor and the owner and shall be noted in the final system As-Built drawings. The following metrics may be monitored for each system; applied vacuum, vacuum at the outer extent of the pressure field, and power consumption.

The Vapor Guardian 5500™, in addition to remotely monitoring the system, will also dynamically control the blower systems. Dynamic controls enable the VIMS to maintain a constant predetermined sub slab pressure differential that is individually set for each blower as part of the electronic management and monitoring system. The system monitors the sub slab vacuum levels and self corrects for pressure induced changes that may occur from HVAC operation, exhaust hoods, wind loading and weather induced indoor pressure differentials. Pressure induced vapor intrusion is more problematic during the winter months when outside air is dense and temperature differentials are the greatest. Gusts and the resultant turbulence will also create low pressures. These low pressures are transferred into the building. The sub slab differential pressure sensor is continually monitored by a programmable logic controller (PLC) which controls the variable frequency drive (VFD) to adjust the blower speed to maintain the predetermined sub slab vacuum

set point. It is anticipated that a dampening function will need to be applied to the drive algorithm so blowers do not servo in response to varying wind speeds as there is a delay time between the applied sub slab vacuum and a change in pressure at the sensor well when depressurizing low permeable soils. The performance data from each blower is stored for analysis and reporting. All performance metrics are monitored hourly and an email is sent if a system's metrics are operating outside of a predetermined range. This system operates 24/7 and provides the opportunity for significant energy savings and reduced ongoing management and reporting costs.



Vapor Guardian Control Logic and Monitoring Diagram

3.10 Pressure Transducers

Electronic monitoring and management of the individual vacuum fields is one of the more critical components of this design. The selection of the electronic monitoring probe locations occurs during start up after the blower system has been powered. There shall be one active sub slab electronic probe location per blower system. Once the blower systems become operational, the induced vacuum field should be mapped by drilling temporary test holes so that the proportional strengths and outer extension of each blower vacuum field can be understood and documented. Once the mapping process is completed, the locations of the permanent electronic pressure differential ports are selected. These ports should be at a location that proportionally relates to the outer extension of the negative pressure field.

Once the locations of the permanent electronic test ports have been selected, a five-inch hole is cored through the slab and a cylindrical area of soil approximately eight inches in diameter by sixteen inches deep is removed from each hole. A ¾ inch PVC probe with a ¼ brass end is centered in the hole, the polyethylene tubing connected and the shielding electrical conduit secured. The void space within the hole is then filled with round washed river stone. Conduit containing the vacuum tube is placed in a channel that is cut into the concrete slab. The channel connects the probe location to the nearest wall or column where the pressure transducer and enclosure will be located. The three-inch hole in which the probe end is located is then sealed with a thin layer, one inch or less, of non-shrink grout which shall serve as a platform for a gas tight seal that is formed using self-leveling urethane. This process ensures that the vacuum levels measured by the transducer are accurate and not influenced by leakage from above the slab. The top of the probe end well and slotted conduit channel shall then be filled with patch concrete flush with the level of the existing floor.

3.11 Fire Stopping

PVC pipes that penetrate fire-rated walls or ceilings shall be protected using intumescent fire fire-rated caulk. Hilti is the recommended manufacturer of fire stopping products.

3.12 Sampling Ports

Test ports for manually measuring vacuum and airflow shall be installed in each of the riser pipes. Ports shall be drilled, taped and plugged using a 3/8-16 x ¾ stainless steel socket cap screw with a neoprene washer. Soil gas samples may also be collected from these ports. Permanent sub slab test ports will be installed at various locations throughout the individual system vacuum fields for the purpose of measuring sub slab vacuum. The vacuum measured at these permanent ports will have a somewhat linear relationship to the vacuum applied at the suction holes and measured at the pressure transducer port. The location of these ports shall be shown on the As-Built drawings.

3.13 System Labeling

A label will be installed at the disconnect switch next to the fan that says, “Active Soil Depressurization System, Do Not Alter.” The electrical circuit at the panel that is used to control the fan will be labeled as “Active Soil Depressurization System”. All risers and at least every 20 feet of exposed horizontal contaminant vent pipe length will have a label that reads “Active Soil Depressurization System” attached to the pipe. All labels shall be readable from three feet away.

4 General Installation Notes

All mitigation system components will be installed to facilitate servicing, maintenance and repair or replacement of other equipment components in or outside the building. Where mounting heights are not detailed, or dimensions not given, system materials and equipment are to be installed to

provide the maximum headroom or side clearance as is possible. The owner's representative will be contacted in cases where a conflict exists. All systems, materials and equipment will be installed level, plumb, parallel or perpendicular to other building systems and components unless otherwise specified.

Every reasonable precaution shall be made to avoid any damage to existing utilities located anywhere in the building or those located in or below the slab floor. Detailed blueprints indicating utility piping in or under the slab are not available. Undocumented sub slab utilities may alter the scope of work. A metal detecting relay box or another similar instrument should be used in conjunction with any slab drilling that does not involve wet coring.

All penetrations through the foundation walls and the roof shall be sealed. There will be no placement of piping or conduit that would inhibit intended use of any areas. No foreign materials shall be left or drawn into the vapor system piping or fan which might at a later period interfere with or in any way impair the vapor system performance. The entire system will have UL or equivalent ratings for both individual components and the entire system as applicable.

5 System Materials

I. Vapor Vent Piping
    a. PVC Schedule 40 pipe and fittings ASTM D-2665
        a. Hollow Core PVC is not permissible
    b. PVC cement clear primer will comply with ASTM F-656
    c. PVC cement adhesive will comply with ASTM D-2564
    d. 3-inch inline PVC slide valves (Valterra Bladex)

II. Piping Supports and Hardware
    a. 3"and 4" " Hanging Pipe Supports
    b. Adjustable swivel ring or standard bolt type clevis hangers
    c. Adjustable band hangers
    d. 3/8" threaded rod
    e. 1/2" threaded rod
    f. Conduit clamps
    g. Assorted bolts, nuts & washers
    h. 1 5/8" C- Profile Galvanized Unistrut
    i. 1 3/16" C- Profile Galvanized Unistrut

III. System Control Valves
    a. 3-inch inline PVC slide valves (Valterra Bladex)

IV. Vapor Blowers
    a. Cincinnati Fan HP-4A16
    b. AMG Force Blower

V. Blower Support Frames
   a. 1 5/8" C- Profile Galvanized Unistrut
   b. Dura Block Block™ Unistrut Supports
   c. Pipe Pier Unistrut Supports

VI. Visual Pressure Indicator and Protective Enclosure
   a. Dwyer Magnehelic (range to be determined)
   b. Integra Enclosures
      i. Single Magnehelic / Sensor Enclosure 16" X 14" H161407H Backing Plate PVCBP-1614
      ii. Sub Slab Sensor Enclosure (2) 8" X 8" H8084H Backing Plate PVCBP-88

VII. Sealing Materials
   a. Gun Grade Urethane Caulk (Vulkem 116)
   b. Flowable Urethane Caulk (Vulkem 45SSL)

VIII. Remote Monitoring and Dynamic Controls
   a. Vapor Guardian 5500 with internal modem (Vapor Dynamics)

IX. Dwyer Magnesense Differential Pressure Transmitters 4-20 mili amp Required
   a. Dwyer Magnesense MS 121 (3)
   b. Dwyer Series 668-7 0" – 25" w.c. (1)
   c. Dwyer Magnesense MS 111 0" - 5" w.c. (1)

Note: Hilti is the suggested manufacturer of fastening products and fire collars

6 Administrative and Final Report

6.1 Permits

It is the responsibility of the installation contractor to secure any municipal permits. The owner will need to provide building access for the municipal building inspectors or any other jurisdictional authority to inspect the relevant components of the SSDS.

6.2 Warranties

The mitigation contractor shall warranty all system components, workmanship, and a minimum cold weather sub slab vacuum level of -0.004" w.c. for a period of one year from the date of system commissioning. Sub slab vacuum extension values are based on the conditions at the date of the diagnostic measurements. The client will not incur any cost for warranty work performed during this period. Fluctuating water tables, sink holes, and other unforeseen sub slab anomalous conditions that may affect sub slab soil gas channeling after commissioning values have been achieved may be considered outside of the warranty. Repairing system damage caused by others is not included in the warranty. Clean Vapor's warranty does not apply to systems installed by others.

6.3 Final Project Report

The pressure field extension beneath the slab created by the SSDS shall be measured with a digital micro-manometer capable of reading down to 0.0001 inches water column. The slide valves in the riser pipes shall be adjusted to facilitate maximum vacuum distribution. Static vacuum measurements for each system will be recorded. All vacuum measurements will be measured in inches of water column. The exhaust airflow from the blower system shall be measured, calculated and reported in cfm.

The final report summarizing remedial activities shall include a summary of remedial activities, As-Built drawings, blower and system performance tables, photo documentation, equipment warranties and material submittals.

The As-Built drawings will be a modification of the original design print and include the specific locations of mechanical equipment and conveyance piping. The electrical panel location and breaker number will also be noted for the blower. The location of all low-pressure gauges will also be on the drawing. The title block will include the final system installation date.

Photo documentation will include at least one picture of the blower installed, the low-pressure panel, system labels, suction points, relevant sealing, fire stopping, post-mitigation vacuum testing and pictures thought to be important by the owner. Warranties and Submittals will include: blower warranties, performance and wiring information and Material “cut sheets”.

The Operations and Maintenance Section will include a table of items to be checked quarterly and annually. A copy of the final report will be maintained by Clean Vapor, and the owner.

7 Submittals

The mitigation contractor shall provide copies of submittals;

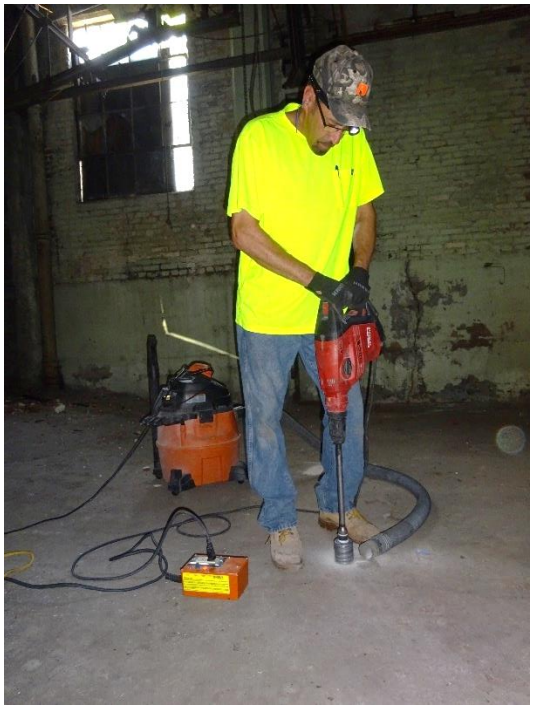
I. Pre Work Submittals
    a. Copy of applicable licenses
    b. Equipment manufacturer cut sheets
II. Post Work Submittals
    a. As-Built drawings to include all applicable mechanical component locations
    b. Final project report
    c. OM&M instructions and recommendations

8 Site Pictures

Basement Floor Level

Street Floor Level

Drilling Small Test Holes



Coring Test Suction Hole

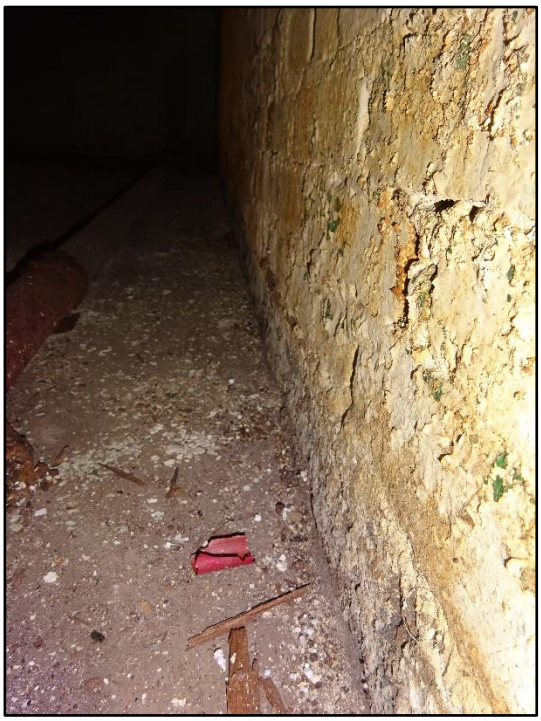
Soil from Beneath the Slab

Compacted Clay Sands on East Side of Building

Applying Known Amounts of Suction to the Sub Slab

Measuring Airflow Yields

Measuring Vacuum Field Extension with Micromanometer



Perimeter Expansion Joint Requiring Sealing

Floor Cracks Requiring Sealing

Floor Discharge Line to be Sealed

Floor Drain to be Sealed

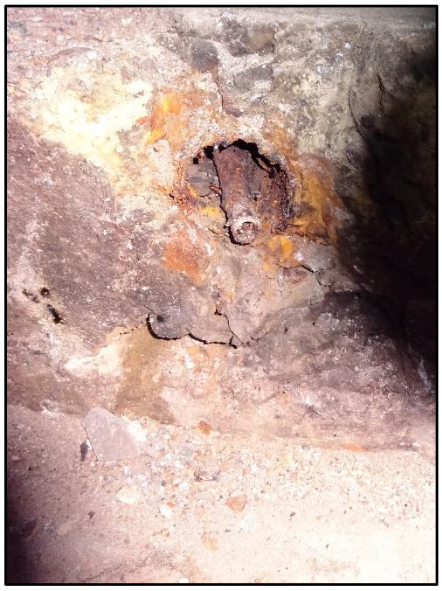
Floor Opening to be Sealed

Floor Opening to be Sealed

Floor Opening to be Sealed

Pit to be Sealed

Seal Opening Around Side Wall Drain Pipe



Side Wall Drain Line to be Sealed

Open Conduits to be Sealed

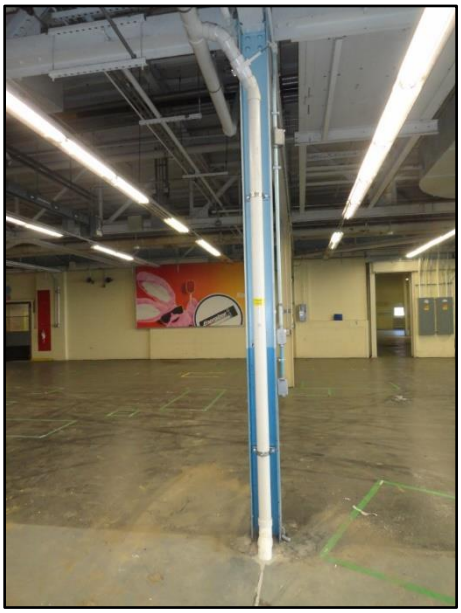
Slab Over Cork Floor

Remnant of Dry Cleaning Operation

Degraded Vaulted Concrete Beam Ceiling

8.1 Installation Example Pictures

Suction Point Sealing



Vertical and Horizontal Pipe Runs

Vertical and Horizontal Pipe Runs

Inline Slide Valve

Elongated Suction Hole Process

Steel Pipe Riser and Horizontal PVC Pipe

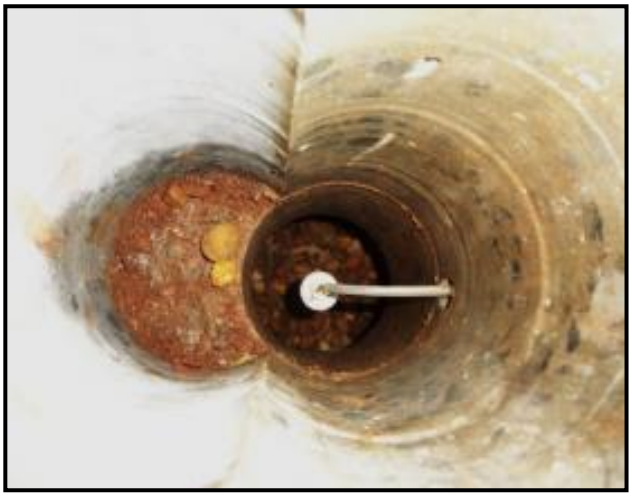
System Label

Permanent Floor Test Port

Testing System Airflow Yields

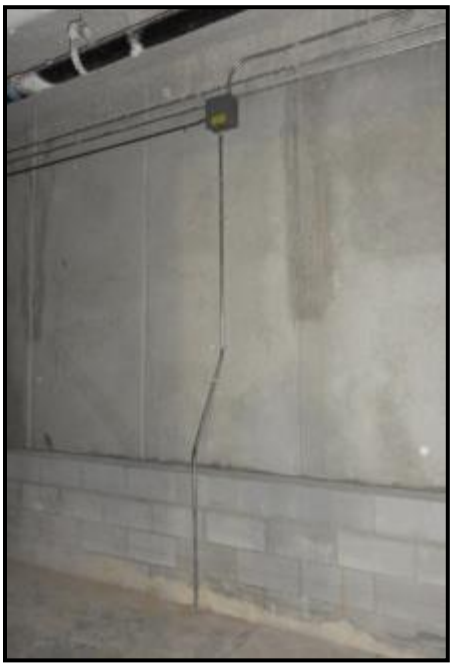
Roof Mounted Radial Blowers

Roof Mounted AMG Force Blower



Pressure Differential Probe Well

Pressure Differential Sensor and Enclosure

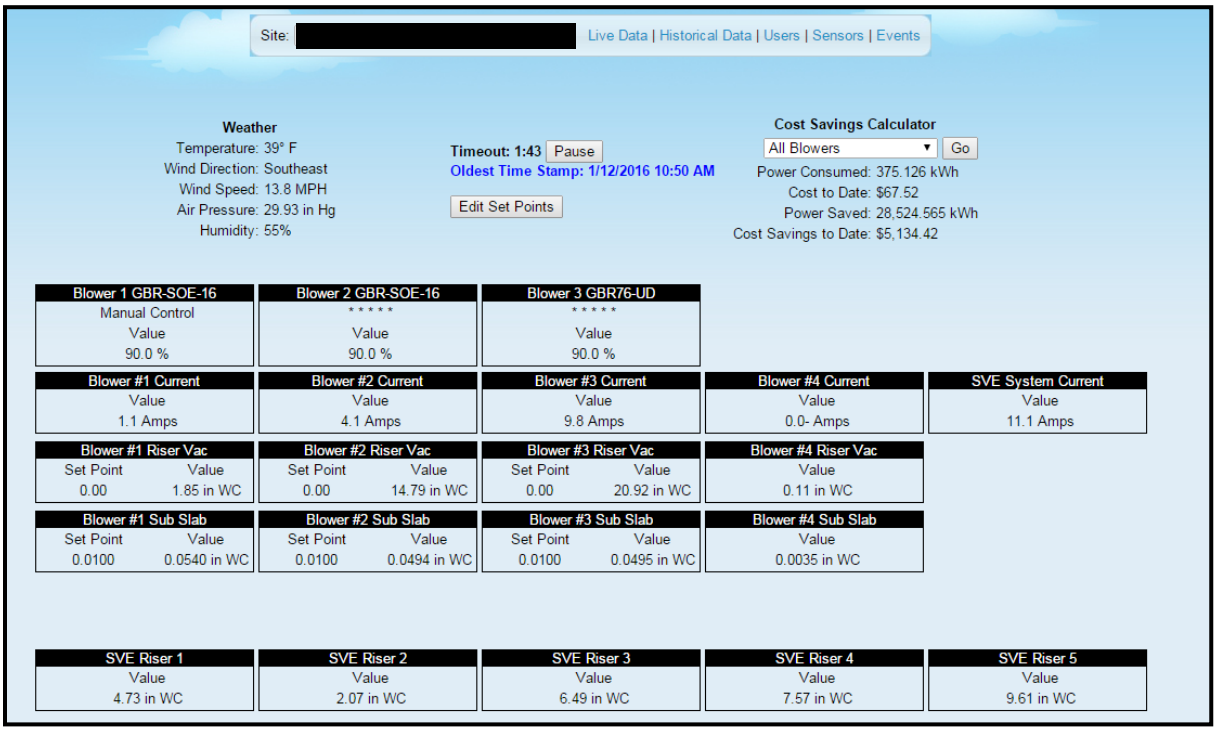


Slab Sensor Well Conduit and Enclosure

Blower Vacuum Sensor Enclosure

Magnehelic Panel and Vapor Guardian 5500 Panel

Vapor Dynamics Vapor Guardian Monitoring and Control Panel



Screenshot of Vapor Dynamics Remote Login Terminal

Appendix A – Drawings

ACTIVE SOIL DEPRESSURIZATION SYSTEM
FORMER SANITARY LAUNDRY
625 N BROADWAY

KNOXVILLE, TENNESSEE

JULY 13, 2018

DRAWING LIST

C	Cover
1	Diagnostic Test Holes
2	Sealing Plan
3	Suction Points & Blowers
4	Mechanical Details

CLEAN VAPOR LLC
V.O.C. & RADON PLAN DESIGN AND REMEDIATION

CLEAN VAPOR LLC

P.O. BOX 688, BLAIRSTOWN, NEW JERSEY 07825

Ph 908 362-5616 Fax 908 362-5433 www.cleanvapor.com

NORTH

FIRST FLOOR PLAN

0 5' 15'

2'-6" 10' 20'

GRAPHIC SCALE

LEGEND

T-X	TEST HOLE
S-X	SUCTION POINT
+/- PD-1	INDOOR / OUTDOOR PRESSURE DIFFERENTIAL
VP-X	EXISTING VAPOR PIN

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V.O.C. & RADON FLOOR DESIGN AND REMEDIATION

ACTIVE SOIL DEPRESSURIZATION SYSTEM
FORMER SANITARY LAUNDRY
625 N BROADWAY
KNOXVILLE, TENNESSEE

REVISION	DATE

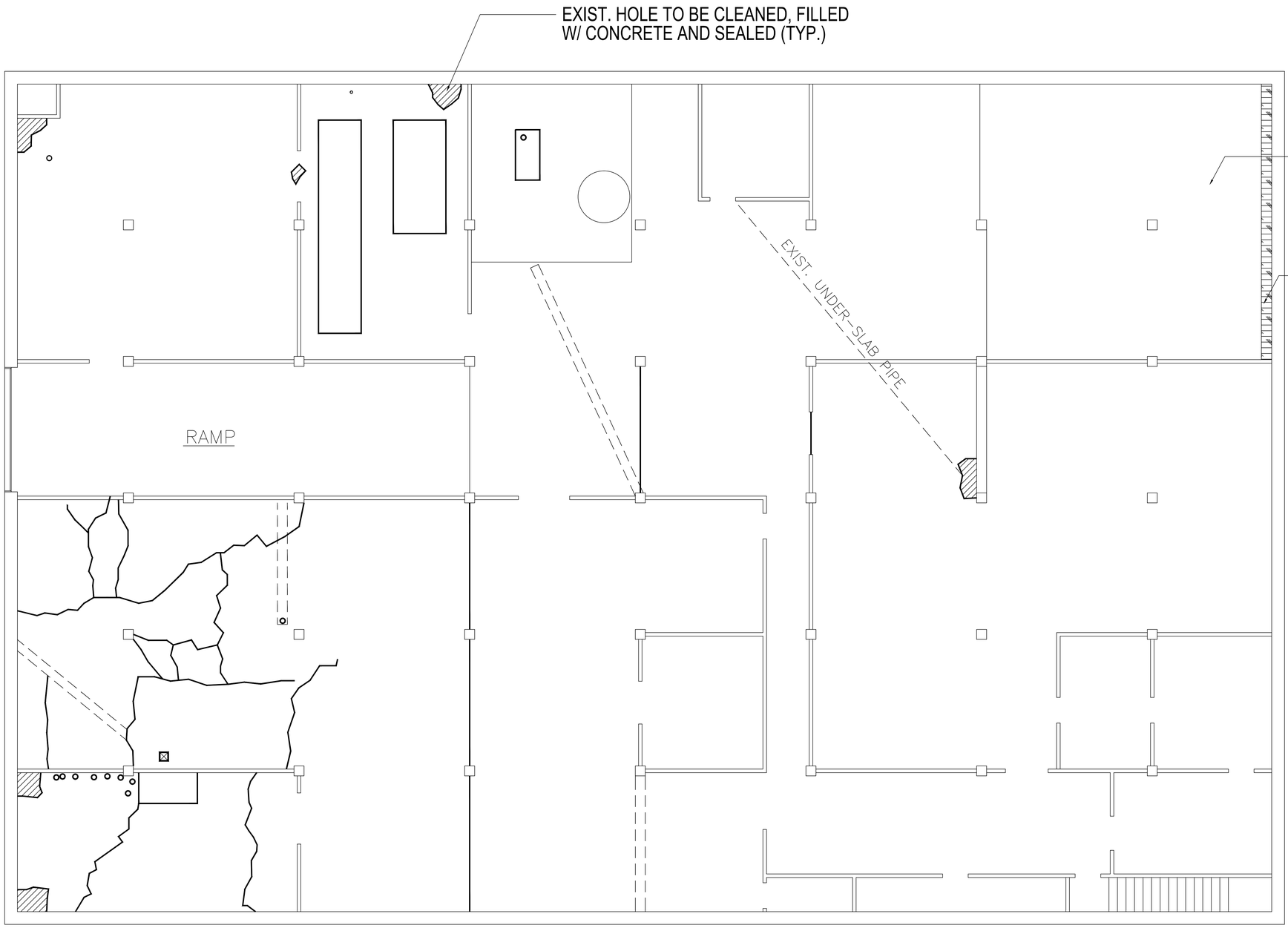
DATE	7-13-18
DRAWN BY	DAB
APPROVED	TEH
SCALE	3/16"=1'
CHECKED BY	TEH

SHEET TITLE

TEST HOLES

SHEET NO.

1



LEGEND

- EXPANSION JOINT
- CRACK IN CONCRETE
- EXISTING DRAIN
- EXISTING TRENCH

NORTH

0 5' 15'

2'-6" 10' 20'

GRAPHIC SCALE

FIRST FLOOR PLAN

NOTE:

SEAL ALL EXISTING EXPANSION JOINTS AS REQ'D. VERIFY THEY ARE CLEANED AND CUT FOR PROPER INSTALLATION (TYP.)

SEAL EXISTING FLOOR PERIMETER JOINTS AS REQ'D. VERIFY THEY ARE CLEANED AND CUT FOR PROPER INSTALLATION (TYP.)

SEALING NOTES:

SEE SPEC SHEET 4 FOR SEALING NOTES

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VOC & RADON FLOOR DESIGN AND REMEDIATION

ACTIVE SOIL DEPRESSURIZATION SYSTEM
FORMER SANITARY LAUNDRY
625 N BROADWAY
KNOXVILLE, TENNESSEE

REVISION	DATE

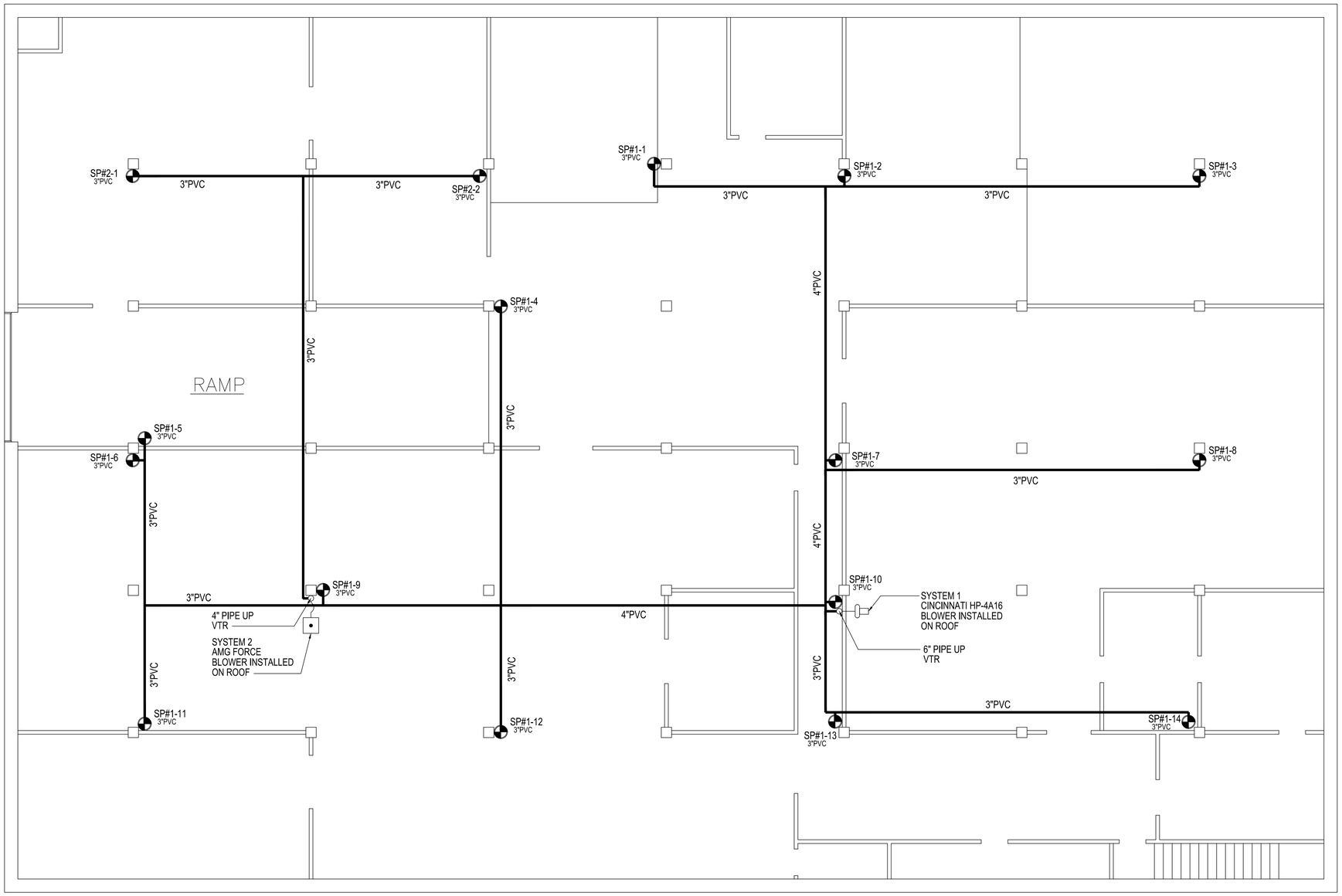
DATE	7-13-18
DRAWN BY	DAB
APPROVED	TEH
SCALE	3/16"=1'
CHECKED BY	TEH

SHEET TITLE

SEALING PLAN

SHEET NO.

2



NORTH

FIRST FLOOR PLAN

0 5' 15'

2'-6" 10' 20'

GRAPHIC SCALE

LEGEND

SP#x-x x"PVC	SUCTION POINT PVC RISER
SP#x-x x"ST	SUCTION POINT STEEL RISER
x"RI	10' RISER TYPE
	CINCINNATI FAN HP-4A16
	AMG FORCE BLOWER
	MAGNEHELIC PANEL*
	ALARM PANEL*
	FIRE COLLAR*

* LOCATION TO BE DETERMINED

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www.cleanvapor.com

CLEAN VAPOR LLC
V.O.C.'S RADON FLOW DESIGN AND REMEDIATION

ACTIVE SOIL DEPRESSURIZATION SYSTEM
FORMER SANITARY LAUNDRY
625 N BROADWAY
KNOXVILLE, TENNESSEE

REVISION	DATE

DATE	7-13-18
DRAWN BY	DAB
APPROVED	TEH
SCALE	3/16"=1'
CHECKED BY	TEH

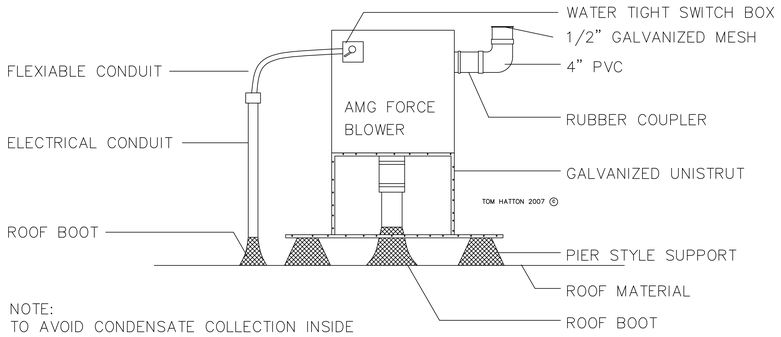
SHEET TITLE

SUCTION PT. & BLOWERS

SHEET NO.

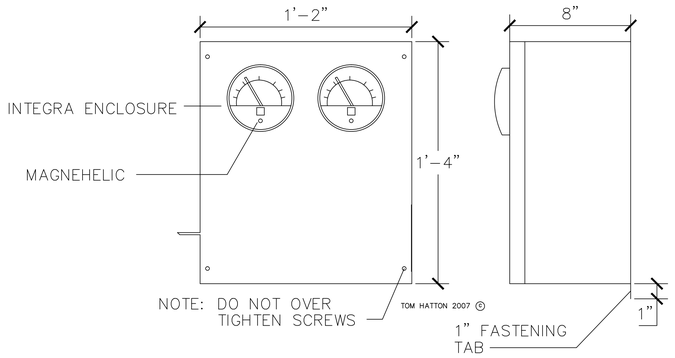
3

ROOF MOUNTED AMG FORCE BLOWER AND SUPPORT DETAIL

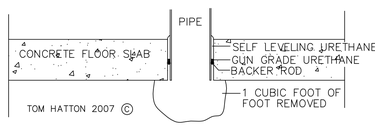


NOTE:
TO AVOID CONDENSATE COLLECTION INSIDE THE BLOWER HOUSING MOUNT AIR INTAKE FACING DOWN

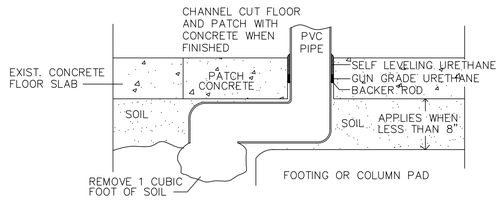
MAGNEHELIC AND PROTECTIVE BOX ENCLOSURE DETAIL



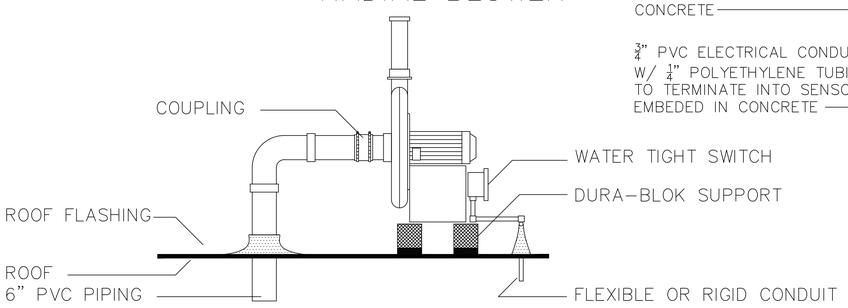
SUCTION POINT DETAIL



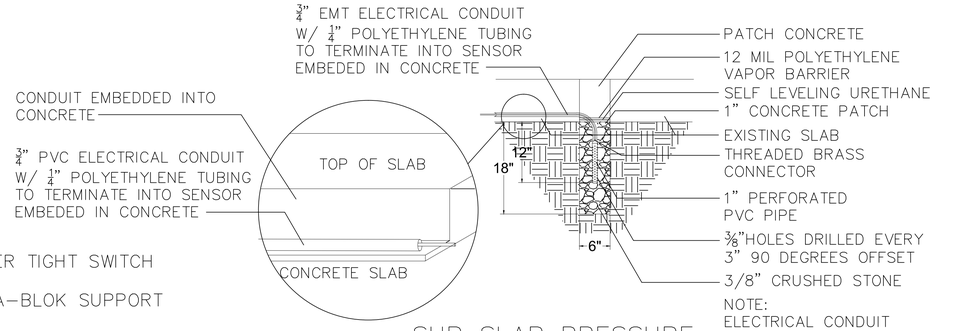
SUCTION POINT DETAIL AT FOOTER



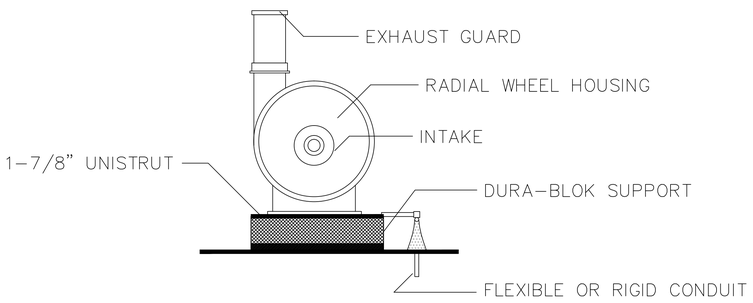
RADIAL BLOWER



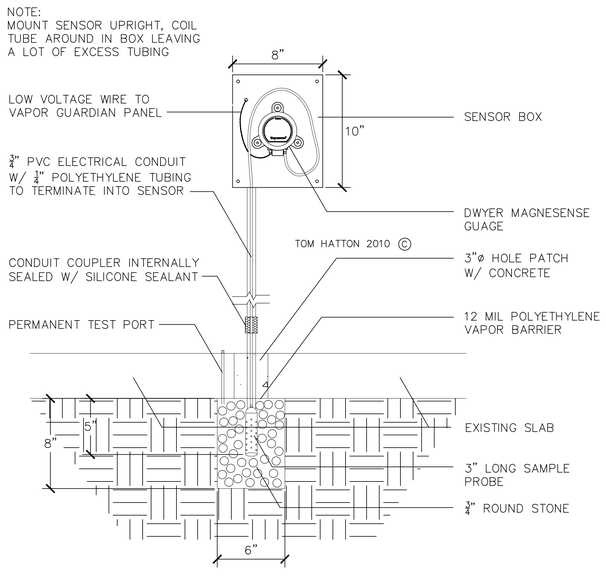
SUB SLAB PRESSURE PROBE DETAIL



RADIAL BLOWER SIDE VIEW DETAIL



SUB SLAB MONITORING WELL



EQUIPMENT SCHEDULE

I. Vapor Vent Piping
- a. PVC Schedule 40 pipe and fittings ASTM D-2665
- a. Hollow Core PVC is not permissible
- b. PVC cement clear primer will comply with ASTM F-656
- c. PVC cement adhesive will comply with ASTM D-2564
- d. 3-inch inline PVC slide valves (Valterra Bladex)

II. Piping Supports and Hardware
- a. 3"and 4" " Hanging Pipe Supports
- b. Adjustable swivel ring or standard bolt type clevis hangers
- c. Adjustable band hangers
- d. 3/8" threaded rod
- e. 1/2" threaded rod
- f. Conduit clamps
- g. Assorted bolts, nuts & washers
- h. 1 5/8" C- Profile Galvanized Unistrut
- i. 1 3/16" C- Profile Galvanized Unistrut

III. System Control Valves
- a. 3-inch inline PVC slide valves (Valterra Bladex)

IV. Vapor Blowers
- a. Cincinnati Fan HP-4A16
- b. AMG Force Blower

V. Blower Support Frames
- a. 1 5/8" C- Profile Galvanized Unistrut
- b. Dura Block BlockTM Unistrut Supports
- c. Pipe Pier Unistrut Supports

VI. Visual Pressure Indicator and Protective Enclosure
- a. Dwyer Magnehelic (range to be determined)
- b. Integra Enclosures
  - i. Single Magnehelic / Sensor Enclosure 16" X 14" H161407H Backing Plate PVCBP-1614
  - ii. Sub Slab Sensor Enclosure (2) 8" X 8" H8084H Backing Plate PVCBP-88

VII. Sealing Materials
- a. Gun Grade Urethane Caulk (Vulkem 116)
- b. Flowable Urethane Caulk (Vulkem 45SSL)

VIII. Remote Monitoring and Dynamic Controls
- a. Vapor Guardian 5500 with internal modem (Vapor Dynamics)

IX. Dwyer Magnesense Differential Pressure Transmitters 4-20 mili amp Required
- a. Dwyer Magnesense MS 121 (3)
- b. Dwyer Series 668-7 0" - 25" w.c. (1)
- c. Dwyer Magnesense MS 111 0" - 5" w.c. (1)

Note: Hilti is the suggested manufacturer of fastening products and fire collars

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VOC & RADON FLOOR DESIGN AND REMEDIATION

ACTIVE SOIL DEPRESSURIZATION SYSTEM
FORMER SANITARY LAUNDRY
625 N BROADWAY
KNOXVILLE, TENNESSEE

REVISION	DATE

DATE	7-13-18
DRAWN BY	DAB
APPROVED	TEH
SCALE	NTS
CHECKED BY	TEH

SHEET TITLE
MECHANICAL DETAILS

SHEET NO.
4

Appendix B – Equipment Cut Sheets

Proposal

Clean Vapor LLC

Attention: Tom Hatton
Subject: Knoxville

ACFM	SP	Temp.	Altitude	Density	Fan RPM	BHP
490	16.0 in. wg	70°F	0 ft. ASL	0.0719 lb/ft³	3530	1.56

Qty	Description	Unit Price	Extended Price
1	Cincinnati Fan HP-4A16, Arrangement 4, Continuously Rising Wheel, CW Rotation, UB Discharge		
	MTR,2 HP,2850/3530 RPM,3PH,50/60Hz,190/380/50 & 230/460/60,TEFC, Prem Eff,FM,145T,1.15 SF,F Insul.,40C Amb.,Double Shielded Bearings,F1 Box, Conduit box ground screw,Stainless Nameplate,Cast Iron Frame, 2 HP & 1.00 SF ON 50 HZ., IE2 ON 50 HZ., MAX-PE TYPE,VFD Capable 20:1 VT		
	Shaft Seal		
	Less Inlet Flange		
	Discharge Flange-Drill Straddle Centers		
	Discharge Guard		

FAN SELECTION And PERFORMANCE

Job Name: Clean Vapor LLC
Reference: Knoxville

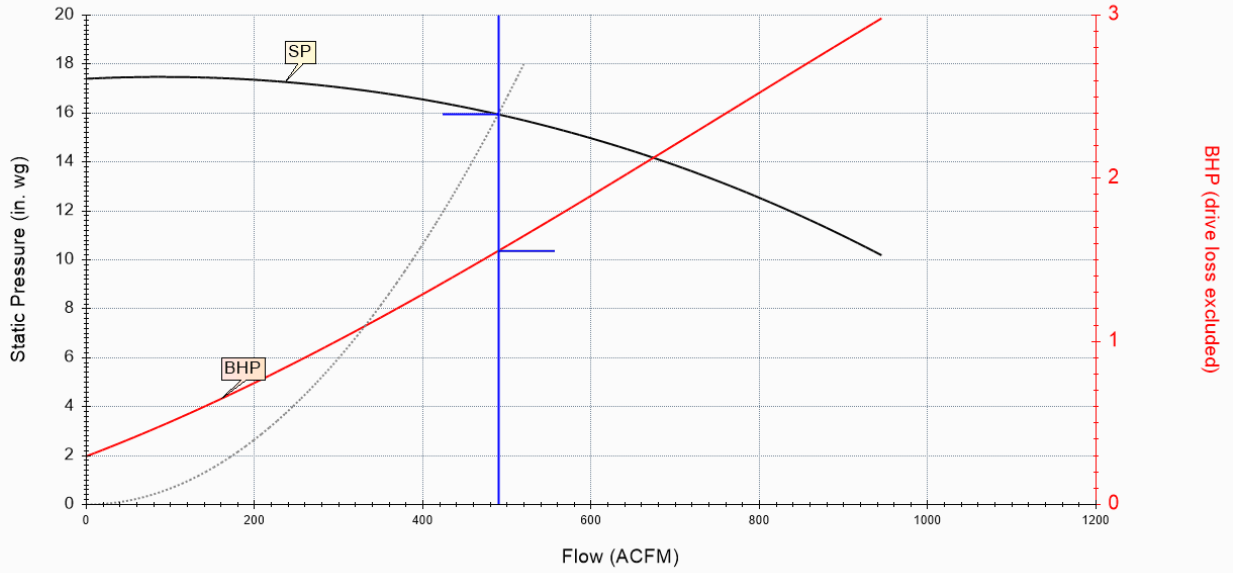
Operating Requirements

Volume, ACFM	490
Static Pressure, in. wg	16.0
Density, lb./ft.³	0.0719
Operating Temperature, °F	70
AMCA Arrangement No.	4
Motor Frequency, Hz	60
Start-Up Temperature, °F	70

Fan Selection and Specifications

Model	HP-4A16		
Fan RPM	3,530		
Wheel Description	16 CR		
Wheel Width, %	100%		
Wheel Diameter, in.	16.00		
Inlet Diameter, in.	6.00		
Outlet Velocity, ft./min.	5,606		
Fan BHP	1.55	Suggested Motor HP:	2.0
Static Efficiency, %	79.0%		
Cold Start BHP	1.55		
Construction Class	N/A		

Cincinnati Fan Model HP-4A16 with 16 CR Wheel (Full Width) @ 3,530 RPM
Rating Point: 490 ACFM @ 16.0 in. wg SP, 0.0719 lb./ft.³ Density, 1.55 BHP



FAN SOUND DATA

Job Name: Clean Vapor LLC
Reference: Knoxville

Operating Requirements

Volume, ACFM	490
Static Pressure, in. wg	16.0
Density, lb./ft.³	0.0719
Operating Temperature, °F	70
AMCA Arrangement No.	4
Motor Frequency, Hz	60
Start-Up Temperature, °F	70

Fan Selection and Specifications

Model	HP-4A16
Fan RPM	3,530
Wheel Description	16 CR
Wheel Width, %	100%
Wheel Diameter, in.	16.00
Inlet Diameter, in.	6.00
Outlet Velocity, ft./min.	5,606
Fan BHP	1.55
Static Efficiency, %	79.0%
Cold Start BHP	1.55
Construction Class	N/A

Fan Sound Data

Lp = Sound Pressure Level at a specific distance from the fan. Measured in decibels (dB) or A-weighted decibels (dB(A)) re 0.0002 microbar.
Lw = Sound Power Level of the fan. Measured in decibels (dB) or A-weighted decibels (dB(A)) re 1E-12 watt.
dB = Decibel, ten times the logarithm (base 10) of the ratio of a value to a reference value.
dB(A) = A-Weighted decibel. A-weighting corrects the spectrum for human hearing response.

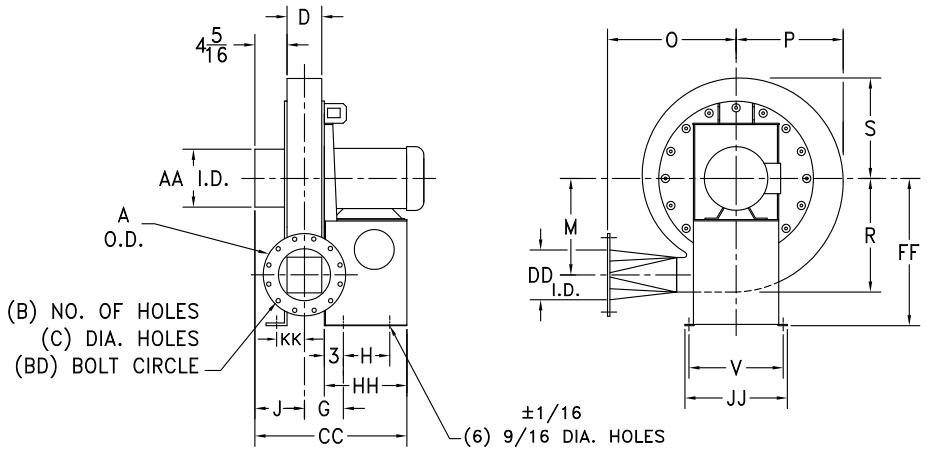
Sound Directivity Factor, Q : 2 - HemiSpherical radiation
Fan Inlet Ducting: Not Ducted
Fan Outlet Ducting: Ducted

Calculated Octave Band Sound Data (dB)

Quantity	63 Hz	125 Hz	250Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000Hz
Lw Total	90	92	89	92	88	83	77	72
Lw Inlet	87	89	86	89	85	80	74	69
Lw Outlet	87	89	86	89	85	80	74	69
Lp Total	75	77	75	77	74	69	63	58
Lp inlet	75	77	74	77	73	68	62	57
Lp outlet	63	65	62	65	61	56	50	45

Total A-weighted Sound Pressure Level, Lp dB(A)	78	at	5.0	feet from fan
Total A-weighted Sound Power Level, Lw dB(A)	93			
Blade Passage Frequency, Hz	530			

- Sound Pressure values are calculated based upon assumed environmental conditions. Actual values may vary for specific installations due to environmental factors (other noise sources, walls, duct design, etc.)
- Noise from the driver is not included in these data.
- Sound Pressure Level calculations assume free field propagation occuring outdoors.
- Duct End Corrections applied (AMCA 300-85 Appendix C).



CLOCKWISE ROTATION, BOTTOM HORIZONTAL DISCHARGE SHOWN

NOTES:
1. TEFLON SHAFT SEAL IS STANDARD.
2. MOTOR MAY EXTEND PAST END OF BASE.
3. FAN HOUSINGS ARE REVERSIBLE AND ROTATABLE IN 45° INCREMENTS.
4. IF AMCA "C" ADD: 1/8 INCH TO DIMENSIONS "G" AND "CC".
5. DISCHARGE FLANGE NOT AVAILABLE WITH DOWN BLAST DISCHARGE ON FOLLOWING MODELS: HP-8B, HP-10D, OR HP-12F.

MODEL *	MOTOR FRAME	D	G ④	H	J	M	O	P	R	S	V	AA	CC ④	FF	HH	JJ	KK	DISCHARGE FLANGE A O.D.	B	C DIA.	BD B.C.	DD
HP-4A	143T-184T	4	5	6 3/4	6 5/16	11 3/4	18	13 9/16	14 7/16	12 3/4	14 3/4	6	21 1/16	21	12 3/4	16 3/4	3	9	8	3/4	7 1/2	4
HP-4C	143T-215T			9		14 13/16	17 15/16	16 7/16	17 7/16	15 7/16	17		23 5/16	25	15	19						
	254T-256T			14									28 5/16		20							
HP-6B	143T-184T	6 3/8	6 3/16	6 3/4	7 1/2	11 3/4	18	13 9/16	14 7/16	12 3/4	14 3/4	8	23 7/16	21	12 3/4	16 3/4	4 3/16	11		7/8	9 1/2	6
	213T-215T			12 1/2									29 3/16		18 1/2							
HP-6C	143T-215T	4	5	9	6 5/16	14 13/16	17 15/16	16 7/16	17 7/16	15 7/16	17	6	23 5/16	25	15	19	3					
	254T-256T			14									28 5/16		20							
HP-6E	184T-256T	5 3/8	5 11/16	13	7	17 7/16	19 3/16	19 3/8	20 9/16	18 3/16	19	8	28 11/16	29	19	21	3 11/16					
HP-8B	143T-184T	6 3/8	6 3/16	6 3/4	7 1/2	11 3/4	19 13/16	13 9/16	14 7/16	12 3/4	14 3/4		23 7/16	21	12 3/4	16 3/4	4 3/16	13 1/2			11 3/4	8
	213T-256T			12 1/2									29 3/16		18 1/2							
HP-8D	182T-215T			9		14 13/16	19 3/4	16 7/16	17 7/16	15 7/16	17		25 11/16	25	15	19						
	254T-286TS			14									30 11/16		20							
HP-8E	184T-256T	5 3/8	5 11/16	13	7	17 7/16	21	19 3/8	20 9/16	18 3/16	19		28 11/16	29	19	21	3 11/16					
	284TS-286TS			15 1/2									31 3/16		21 1/2							
HP-10D	184T-215T	6 3/8	6 3/16	9	7 1/2	14 13/16	21 3/4	16 7/16	17 7/16	15 7/16	17		25 11/16	25	15	19	4 3/16	16	12	1	14 1/4	10
	254T-286TS			14									30 11/16		20							
HP-10F	213T-256T	7 3/8	6 11/16	13	8	17 7/16	23	19 3/8	20 9/16	18 3/16	19	10	33 3/16	29	19	21	4 11/16					
	284TS-326TS			15 1/2									39 11/16		21 1/2							
	364TS-365TS			22									30 11/16		28							
HP-12F	184T-256T			13									33 3/16		19			19			17	12
	284TS-326TS			15 1/2									39 11/16		21 1/2							
	364TS-365TS			22											28							

* COMPLETE MODEL NUMBER INCLUDES WHEEL DIA.

cincinnati fan
7697 SNIDER ROAD MASON, OHIO 45040

TOLERANCES:
ANGLES: ± 1°
FRACTIONS ±1/8
ALL DIMENSIONS IN INCHES UNLESS OTHERWISE SPECIFIED

SUPERSEDES:

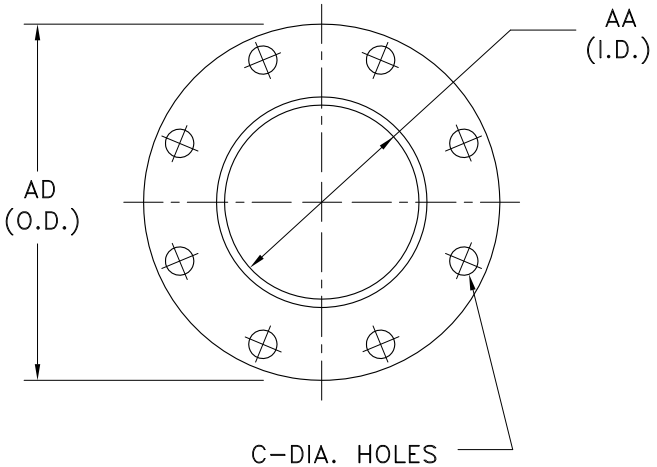
CERTIFIED DRAWING

TITLE: HP SERIES II, ARR. 4
W/O INLET FLANGE, INLET TO GROUND

A

DRAWING NO. 63065G

REV.

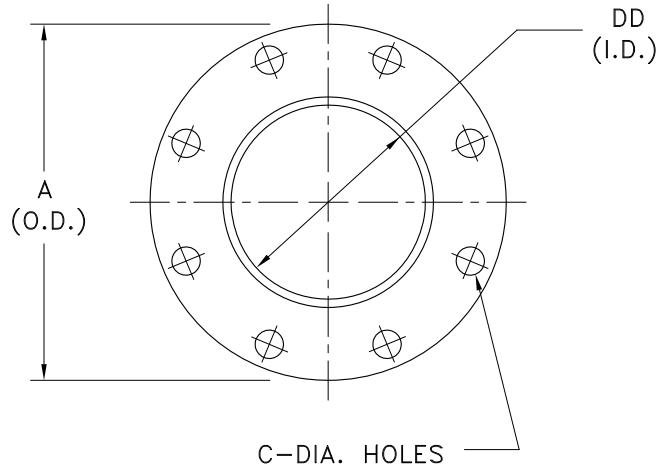


INLET FLANGE

☐ OPTIONAL HOLE PATTERN:
FLANGE HOLES ON
MAJOR CENTERLINES

NOTES:

1. STANDARD HOLE PATTERN IS FOR FLANGE HOLES TO STRADDLE CENTERLINES.
2. DRILL PATTERNS SHOWN MATCH ANSI CLASS 150.
3. FLANGE THICKNESS IS NOT ANSI.



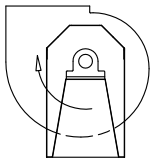
DISCHARGE FLANGE

☐ OPTIONAL HOLE PATTERN:
FLANGE HOLES ON
MAJOR CENTERLINES

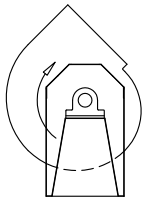
	DIMENSIONS					
MODEL	INLET SIZE	AD O.D.	AA I.D.	BD B.C.	C DIA.	D
HP–4A,4C,6C	6	11	6	9–1/2	7/8	8
HP–6B,6E,8B 8D,8E,10D	8	13–1/2	8	11–3/4	7/8	8
HP–10F,12F	10	16	10	14–1/4	1	12
HP–12G	14	21	14	18–3/4	1–1/8	12

	DIMENSIONS					
MODEL	DISCHARGE SIZE	A O.D.	DD I.D.	BD B.C.	C DIA.	D
HP–4A,4C	4	9	4	7–1/2	3/4	8
HP–6B,6C,6E	6	11	6	9–1/2	7/8	8
HP–8B,8D,8E	8	13–1/2	8	11–3/4	7/8	8
HP–10D,10F	10	16	10	14–1/4	1	12
HP–12F,12G	12	19	12	17	1	12

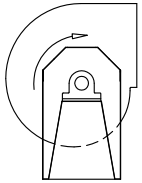
CLOCKWISE ROTATION



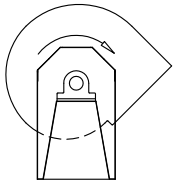
CLOCKWISE
UP BLAST



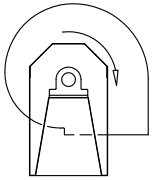
CLOCKWISE
TOP ANGULAR UP



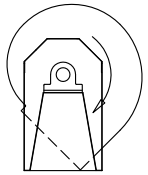
CLOCKWISE
TOP HORIZONTAL



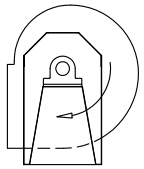
CLOCKWISE
TOP ANGULAR DOWN



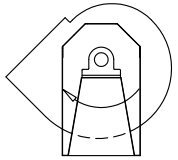
CLOCKWISE
DOWN BLAST



CLOCKWISE
BOTTOM ANGULAR DOWN

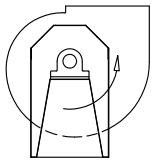


CLOCKWISE
BOTTOM HORIZONTAL

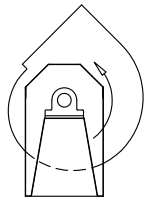


CLOCKWISE
BOTTOM ANGULAR UP

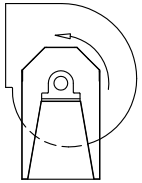
COUNTERCLOCKWISE ROTATION



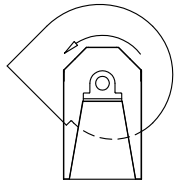
COUNTERCLOCKWISE
UP BLAST



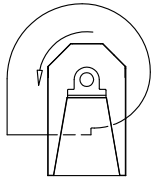
COUNTERCLOCKWISE
TOP ANGULAR UP



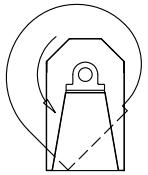
COUNTERCLOCKWISE
TOP HORIZONTAL



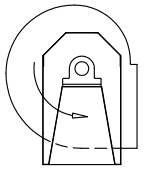
COUNTERCLOCKWISE
TOP ANGULAR DOWN



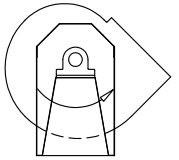
COUNTERCLOCKWISE
DOWN BLAST



COUNTERCLOCKWISE
BOTTOM ANGULAR DOWN



COUNTERCLOCKWISE
BOTTOM HORIZONTAL

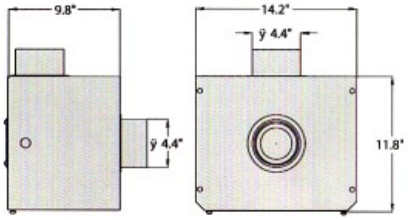


COUNTERCLOCKWISE
BOTTOM ANGULAR UP

NOTES:

1. DIRECTION OF ROTATION IS DETERMINED FROM DRIVE SIDE OF FAN.
2. SAME AS AMCA STANDARD 99–2406.

AMG Force



AMG Force, Radon Extract Fan Performance Figures

				CFM at STATIC PRESSURE in. w.g.										
Model	**Volts**	**Watts**	**Max. Amps**	**0"**	**0.5"**	**1.0"**	**1.5"**	**2.0"**	**2.5"**	**3.0"**	**3.5"**	**4.0"**	**4.5"**	**5"**
AMG Force	120V 60Hz	302	2.48	240	223	207	191	174	155	133	110	83	55	28
Weight: 8 lbs. 3 oz. Fan Speed: 3000 rpm														

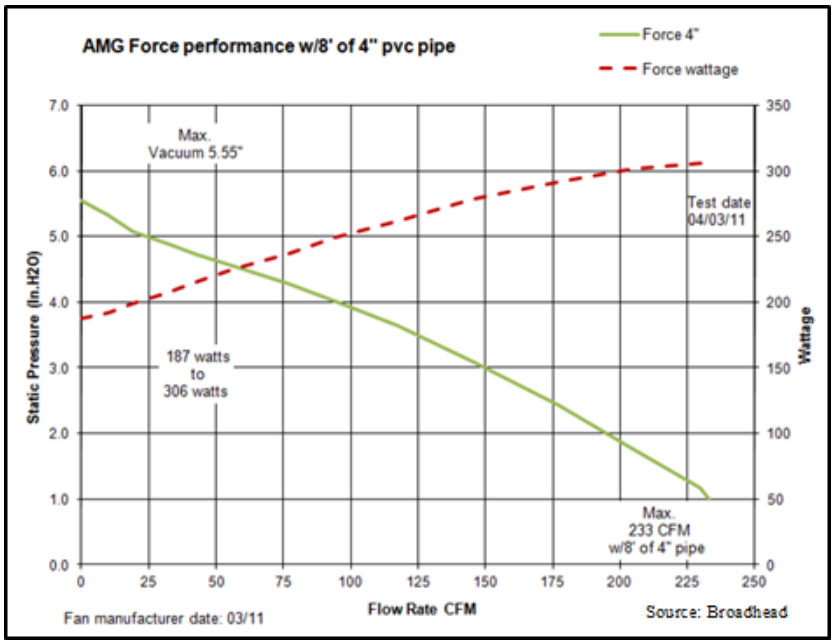
Performance shown is for installation type D - Ducted inlet, Ducted outlet.
Speed (rpm) shown is nominal. Performance is based on actual speed of test.
Performance ratings do not include the effects of appurtenances in the air stream.
The performance figures shown have been corrected to standard air density.

*We have brackets, too!

To Order Call 1 (800) 806-7866 or 1 (877) 264-3267

Festa Manufacturing Enterprises, LLC.
Festa International Radon Supply Technologies, Co.
Festa Radon Technologies Co.

1 (800) 806-7866 1 (877) 264-3267
47A Progress Avenue, Cranberry Twp., PA 16066



DURA-BLOK™ Rooftop Supports

DURA-BLOK is made from 100% recycled rubber and qualifies for LEED credits. Reflective strips on both sides allow for easy product visibility.

Channels are through bolted on all sizes for added strength and a 1" (25.4mm) gap between blocks allows water to flow freely around longer assemblies.

Product composition is not sharp or abrasive, helping to extend the roof life and no penetration through the roof is required.

The DURA-BLOK dampens vibration, needs no supplemental rubber pad, and will not float or blow away.

DURA-BLOK can be used to support piping, HVAC/Ducts, roof walkways, conduit and cable tray.

Base Only

DBP


DBM

Base Only

Dimensions - 4" (101mm) High x 6" (152mm) Wide x Base Length

Material - 100% recycled rubber, UV resistant

Ultimate Load Capacity - (uniform load) *

DBP = 500 lbs. (2.22kN)

DBM = 200 lbs. (0.89kN)

DURA-BLOK channel support is designed as an economical support for piping systems, cable tray, HVAC equipment and many other applications. The DURA-BLOK is UV resistant and is suitable for any type of roofing material or other flat surfaces. Material effectively accepts screw fasteners for securing accessories.

Part No.	Weight Each
DBP	4.48 (2.03kg)
DBM	2.35 (1.07kg)

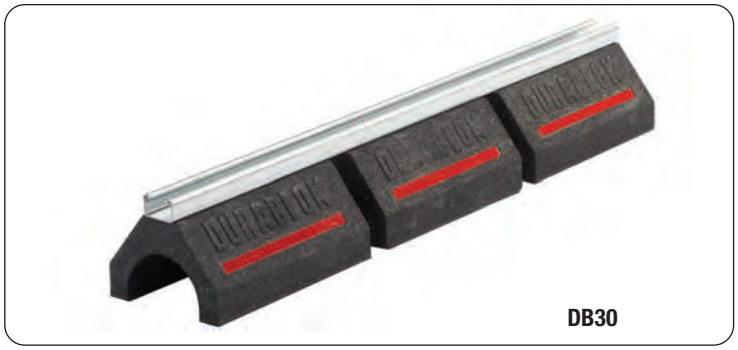
Part No.	Height	Width	Length
DBP	4" (101mm)	6" (152mm)	9.6" (244mm)
DBM	4" (101mm)	6" (152mm)	4.8" (122mm)

*** For Roof Loading, Consult Roofing Manufacturer or Engineer. As with most commercial roofs, the weakest point may be the insulation board beneath the rubber membrane.**

All dimensions in charts and on drawings are in inches. Dimensions shown in parentheses are in millimeters unless otherwise specified.

DB - Series

DB10



DB30

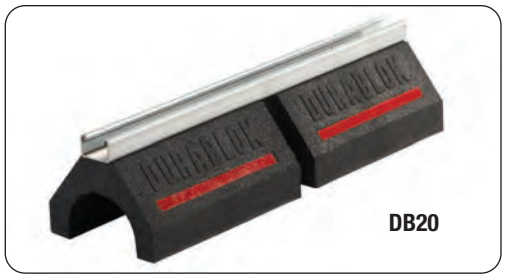
Base with 14 ga. (1.9mm) Galv. Channel - 1" (25.4mm) high

Dimensions - 5" (127mm) High x 6" (152mm) Wide x Length (overall length)
Material - 100% recycled rubber, UV resistant
Ultimate Load Capacity - (uniform load) *

DB5 = 500 lbs. (2.22kN)
DB10 = 500 lbs. (2.22kN)
DB20 = 1,000 lbs. (4.45kN)
DB30 = 1,500 lbs. (6,67kN)
DB40 = 2,000 lbs. (8.89kN)
DB48 = 2,500 lbs. (11.12kN)

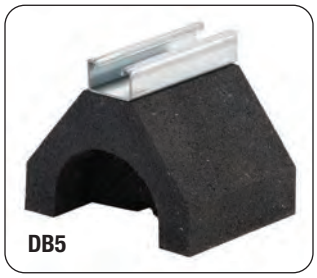
DURA-BLOK DB-Series channel support is designed for superior support of piping systems, cable tray, HVAC equipment, walkway systems and many other applications. The DURA-BLOK is UV resistant and suitable for installation on any type of roofing material or other flat surfaces. For sloped roofs see adjustable hinge fitting (B634).

Part No.	Weight Each
DB5	2.75 (1.25kg)
DB10	5.28 (2.39kg)
DB20	10.63 (4.82kg)
DB30	15.99 (7.25kg)
DB40	21.34 (9.68kg)
DB48	26.70 (12.4kg)



DB20

Part No.	Height	Width	Overall Length
DB5	5" (127mm)	6" (152mm)	4.8" (122mm)
DB10	5" (127mm)	6" (152mm)	9.6" (244mm)
DB20	5" (127mm)	6" (152mm)	20.2" (513mm)
DB30	5" (127mm)	6" (152mm)	30.8" (782mm)
DB40	5" (127mm)	6" (152mm)	41.4" (1052mm)
DB48	5" (127mm)	6" (152mm)	52.0" (1321mm)


DB5

For pipe straps/clamps, rollers and roller supports that can be used with these DURA-BLOK supports, see page 284.

*** For Roof Loading, Consult Roofing Manufacturer or Engineer. As with most commercial roofs, the weakest point may be the insulation board beneath the rubber membrane.**

DB6 - Series

Base with 12 ga. (2.6mm) Galv. Channel - 2 7/16" (62mm) high

Dimensions - 6 7/16" (163mm) High x 6" (152mm) Wide x Length (overall length)
Material - 100% recycled rubber, UV resistant
Ultimate Load Capacity - (uniform load) *

DB610 = 500 lbs. (2.22kN)
DB620 = 1,000 lbs. (4.45kN)
DB630 = 1,500 lbs. (6.67kN)
DB640 = 2,000 lbs. (8.89kN)
DB648 = 2,500 lbs. (11.12kN)

DURA-BLOK DB6-Series channel support is designed for superior support of piping systems, cable tray, HVAC equipment, walkway systems and many other applications. The DURA-BLOK is UV resistant and suitable for installation on any type of roofing material or other flat surfaces. For sloped roofs see adjustable hinge fitting (B634).

Part No.	Weight Each
DB610	6.36 (2.88kg)
DB620	12.90 (5.85kg)
DB630	19.45 (8.82kg)
DB640	26.00 (11.79kg)
DB648	32.55 (14.76kg)

Part No.	Height	Width	Overall Length
DB610	6 7/16" (167mm)	6" (152mm)	9.6" (244mm)
DB620	6 7/16" (167mm)	6" (152mm)	20.2" (513mm)
DB630	6 7/16" (167mm)	6" (152mm)	30.8" (782mm)
DB640	6 7/16" (167mm)	6" (152mm)	41.4" (1052mm)
DB648	6 7/16" (167mm)	6" (152mm)	52.0" (1321mm)

For pipe straps/clamps, rollers and roller supports that can be used with these DURA-BLOK supports, see page 284.

*** For Roof Loading, Consult Roofing Manufacturer or Engineer. As with most commercial roofs, the weakest point may be the insulation board beneath the rubber membrane.**

All dimensions in charts and on drawings are in inches. Dimensions shown in parentheses are in millimeters unless otherwise specified.

DB10 - Series

Two (2) Bases with 12 ga. (2.6mm) Galv. Channel - 1 5/8" (41mm) high

Dimensions - 5 5/8" (143mm) High x 6" (152mm) Wide x Length (overall length)
Material - 100% recycled rubber, UV resistant
Ultimate Load Capacity - 1,000 lbs. (4.45kN) (uniform load) *

DURA-BLOK DB10-Series channel support is designed for superior support of piping systems, cable tray, HVAC equipment, walkway systems and many other applications. The DURA-BLOK is UV resistant and suitable for installation on any type of roofing material or other flat surfaces.

Part No.	Weight Each
DB10-28	13.16 (5.97kg)
DB10-36	14.36 (6.51kg)
DB10-42	15.52 (7.04kg)
DB10-50	16.45 (7.46kg)
DB10-60	17.94 (8.14kg)

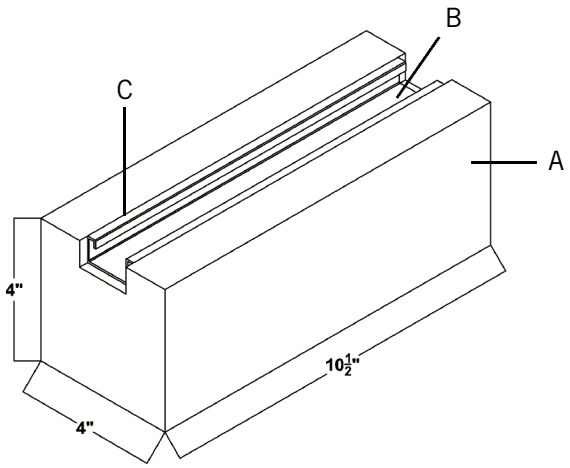
Part No.	Height	Individual Base Length	Bridge Length
DB10-28	5 5/8" (143mm)	9.6" (244mm)	28" (711mm)
DB10-36	5 5/8" (143mm)	9.6" (244mm)	36" (914mm)
DB10-42	5 5/8" (143mm)	9.6" (244mm)	42" (1067mm)
DB10-50	5 5/8" (143mm)	9.6" (244mm)	50" (1270mm)
DB10-60	5 5/8" (143mm)	9.6" (244mm)	60" (1524mm)

For pipe straps/clamps, rollers and roller supports that can be used with these DURA-BLOK supports, see page 284.

*** For Roof Loading, Consult Roofing Manufacturer or Engineer. As with most commercial roofs, the weakest point may be the insulation board beneath the rubber membrane.**

PIPE PIER® support blocks have been designed and engineered specifically for rootop and raised floor applications. The PIPE PIER® Classic series is offered in two different heights:

- ☐ **PIPE PIER® 50H6 –** 6"x4"x10-1/2" with a 50 lbs max load
- ☐ **PIPE PIER® 50H4 –** 4"x4"x10-1/2" with a 50 lbs max load



Components

A. Closed-cell, medium density, black polyethylene foam Ethafoam HS 45*

B. 14 Gauge Strut Channel

C. Hot melt adhesive-bonding strut to foam block BONDMASTER INSTAWELD 34-3378

**Trademark of Dow Chemical Co.*

Ethafoam HS 45* polyethylene foam offers excellent strength, resistance to creep under loadings up to 5.0 psi, vibration & shock absorbency and water resistance characteristics. Ethafoam HS 45 has successfully passed MVSS 302 flammability testing and meets or exceeds the requirements for U.S. Federal Standard PPP-C-1752C, Type III.

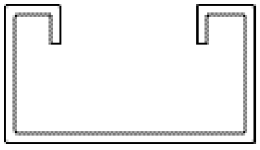
**Trademark of Dow Chemical Co.*

Physical Properties	Test Method	Direction	Value
Density	D3575, Suffix W, Method B	N/A	3.9 pcf
Compression Set	ASTM D 3575, Suffix B	Vertical	<15%
Compression Creep @ 5.0 psi (1000 hr/72 F)	ASTM D 3575, Suffix BB	Vertical	<10%
Thermal Stability	ASTM D 3575, Suffix S	N/A	<1%
Water Absorption	ASTM D 3575, Suffix L	N/A	<0.2 lb/sq ft

---

14 Gauge Strut Channel

The 14 gauge strut channel is cold roll-formed from high quality carbon steel. The channel finish is hot dipped mill galvanized. The raw steel used conforms to ASTM 570 GR 33 and ASTM A446 GR A.



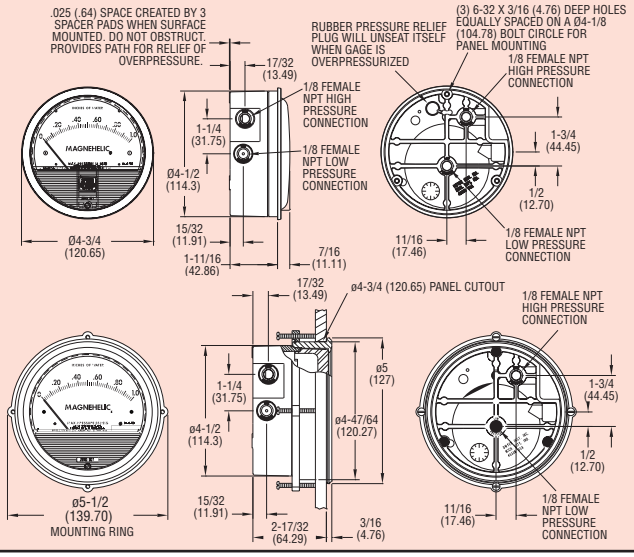
BONDMASTER INSTAWELD 34-3378 is a sprayable heat & moisture-resistant hot melt adhesive. It has a 350 degree melting point and is applied by a nozzle applicator during the manufacturing process. It conforms to MS-CC926.

Series 2000

Magnehelic® Differential Pressure Gages

Indicate Positive, Negative or Differential, Accurate within 2%

RoHS



Select the Dwyer® Magnehelic® gage for high accuracy – guaranteed within 2% of full-scale – and for the wide choice of 81 models available to suit your needs precisely. Using Dwyer's simple, frictionless Magnehelic® gage movement, it quickly indicates low air or non-corrosive gas pressures – either positive, negative (vacuum) or differential. The design resists shock, vibration and over-pressures. No manometer fluid to evaporate, freeze or cause toxic or leveling problems. It's inexpensive, too.

The Magnehelic® gage is the industry standard to measure fan and blower pressures, filter resistance, air velocity, furnace draft, pressure drop across orifice plates, liquid levels with bubbler systems and pressures in fluid amplifier or fluidic systems. It also checks gas-air ratio controls and automatic valves, and monitors blood and respiratory pressures in medical care equipment.

Mounting

A single case size is used for most models of Magnehelic® gages. They can be flush or surface mounted with standard hardware supplied. Although calibrated for vertical position, many ranges above 1″ may be used at any angle by simply re-zeroing. However, for maximum accuracy, they must be calibrated in the same position in which they are used. These characteristics make Magnehelic® gages ideal for both stationary and portable applications. A 4-9/16″ hole is required for flush panel mounting. Complete mounting and connection fittings, plus instructions, are furnished with each instrument. See page 7 for more information on mounting accessories.

Flush, Surface or Pipe Mounted

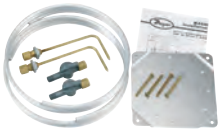
Enclosure Mounted

SPECIFICATIONS

Service: Air and non-combustible, compatible gases (natural gas option available).
Note: May be used with hydrogen. Order a Buna-N diaphragm. Pressures must be less than 35 psi.
Wetted Materials: Consult factory.
Housing: Die cast aluminum case and bezel, with acrylic cover. Exterior finish is coated gray to withstand 168 hour salt spray corrosion test.
Accuracy: ±2% of FS (±3% on - 0, -100 Pa, -125 Pa, 10MM and ±4% on - 00, -60 Pa, -6MM ranges), throughout range at 70°F (21.1°C).
Pressure Limits: -20 in Hg to 15 psig† (-0.677 to 1.034 bar); MP option: 35 psig (2.41 bar); HP option: 80 psig (5.52 bar).
Overpressure: Relief plug opens at approximately 25 psig (1.72 bar), standard gages only. See Overpressure Protection Note on next page.
Temperature Limits: 20 to 140°F* (-6.67 to 60°C). -20°F (-28°C) with low temperature option.
Size: 4″ (101.6 mm) diameter dial face.
Mounting Orientation: Diaphragm in vertical position. Consult factory for other position orientations.
Process Connections: 1/8″ female NPT duplicate high and low pressure taps - one pair side and one pair back.
Weight: 1 lb 2 oz (510 g), MP & HP 2 lb 2 oz (963 g).
Standard Accessories: Two 1/8″ NPT plugs for duplicate pressure taps, two 1/8″ pipe thread to rubber tubing adapter, and three flush mounting adapters with screws. (Mounting and snap ring retainer substituted for three adapters in MP & HP gage accessories.)
Agency Approval: RoHS. **Note:** -SP models not RoHS approved.
†For applications with high cycle rate within gage total pressure rating, next higher rating is recommended. See Medium and High pressure options at lower left.

ACCESSORIES

Model A-432 Portable Kit
Combine carrying case with any Magnehelic® gage of standard range, except high pressure connection. Includes 9 ft (2.7 m) of 3/16″ ID rubber tubing, standhang bracket and terminal tube with holder.



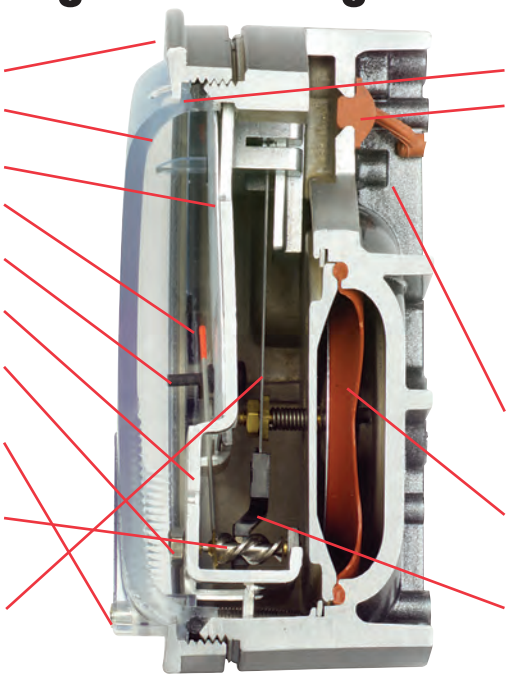
Model A-605 Air Filter Gage Accessory Kit
Adapts any standard Magnehelic® gage for use as an air filter gage. Includes aluminum surface mounting bracket with screws, two 5 ft (1.5 m) lengths of 1/4″ aluminum tubing two static pressure tips and two molded plastic vent valves, integral compression fittings on both tips and valves.

A-605B Air Filter Gage Accessory Kit, Air filter kit with two plastic open/close valves, two 4″ steel static tips, plastic tubing and mounting flange

A-605C Air Filter Gage Accessory Kit, Air filter kit with two plastic open/close valves, two plastic static tips, plastic tubing and mounting flange

Series 2000

Magnehelic® Gage Models & Ranges



Bezel provides flange for flush mounting in panel.

Clear plastic face is highly resistant to breakage. Provides undistorted viewing of pointer and scale.

Precision litho-printed scale is accurate and easy to read.

Red tipped pointer of heat treated aluminum tubing is easy to see. It is rigidly mounted on the helix shaft.

Pointer stops of molded rubber prevent pointer over-travel without damage.

"Wishbone" assembly provides mounting for helix, helix bearings and pointer shaft.

Jeweled bearings are shock-resistant mounted; provide virtually friction-free motion for helix. Motion damped with high viscosity silicone fluid.

Zero adjustment screw is conveniently located in the plastic cover, and is accessible without removing cover. O-ring seal provides pressure tightness.

Helix is precision made from an alloy of high magnetic permeability. Mounted in jeweled bearings, it turns freely, following the magnetic field to move the pointer across the scale.

Calibrated range spring is flat spring steel. Small amplitude of motion assures consistency and long life. It reacts to pressure on diaphragm. Live length adjustable for calibration.

O-ring seal for cover assures pressure integrity of case.

OVERPRESSURE PROTECTION
Blowout plug is comprised of a rubber plug on the rear which functions as a relief valve by unseating and venting the gage interior when over pressure reaches approximately 25 psig (1.7 bar). To provide a free path for pressure relief, there are four spacer pads which maintain 0.023˝ clearance when gage is surface mounted. Do not obstruct the gap created by these pads. The blowout plug is not used on models above 180˝ of water pressure, medium or high pressure models, or on gages which require an elastomer other than silicone for the diaphragm. The blowout plug should not be used as a system overpressure control. High supply pressures may still cause the gage to fail due to over pressurization, resulting in property damage or serious injury. Good engineering practices should be utilized to prevent your system from exceeding the ratings or any component.

Die cast aluminum case is precision made and iridite-dipped to withstand 168 hour salt spray corrosion test. Exterior finished in baked dark gray hammerloid. One case size is used for all standard pressure options, and for both surface and flush mounting.

Silicone rubber diaphragm with integrally molded O-ring is supported by front and rear plates. It is locked and sealed in position with a sealing plate and retaining ring. Diaphragm motion is restricted to prevent damage due to overpressures.

Samarium Cobalt magnet mounted at one end of range spring rotates helix without mechanical linkages.

Model	Range Inches of Water
2000-00N†••	.05-0-.2
2000-00†••	0-.25
2000-0†•	0-.50
2001	0-1.0
2002	0-2.0
2003	0-3.0
2004	0-4.0
2005	0-5.0
2006	0-6.0
2008	0-8.0
2010	0-10
2012	0-12
2015	0-15
2020	0-20
2025	0-25
2030	0-30
2040	0-40
2050	0-50
2060	0-60
2080	0-80
2100	0-100
2120	0-120
2150	0-150
2160	0-160
2180*	0-180
2250*	0-250
Zero Center Ranges	
2300-00†••	0.125-0-0.125
2300-0†•	.25-0-.25
2301	.5-0-.5
2302	1-0-1
2304	2-0-2
2310	5-0-5
2320	10-0-10
2330	15-0-15

Model	Range PSI
2201	0-1
2202	0-2
2203	0-3
2204	0-4
2205	0-5
2210*	0-10
2215*	0-15
2220*	0-20
2230**	0-30

Model	Range, CM of Water
2000-15CM	0-15
2000-20CM	0-20
2000-25CM	0-25
2000-50CM	0-50
2000-80CM	0-80
2000-100CM	0-100
2000-150CM	0-150
2000-200CM	0-200
2000-250CM	0-250
2000-300CM	0-300
Zero Center Ranges	
2300-4CM	2-0-2
2300-10CM	5-0-5
2300-30CM	15-0-15

†These ranges calibrated for vertical scale position.
• Accuracy +/-3%
• • Accuracy +/-4%
*MP option standard
**HP option standard

Model	Range MM of Water
2000-6MM†••	0-6
2000-10MM†•	0-10
2000-15MM	0-15
2000-25MM	0-25
2000-30MM	0-30
2000-50MM	0-50
2000-80MM	0-80
2000-100MM	0-100
2000-125MM	0-125
2000-150MM	0-150
2000-200MM	0-200
2000-250MM	0-250
2000-300MM	0-300
Zero Center Ranges	
2300-6MM†••	3-0-3
2300-10MM†•	5-0-5
2300-20MM†•	10-0-10

Model	Range, Pa
2000-60NPA†••	10-0-50
2000-60PA†••	0-60
2000-100PA†•	0-100
2000-125PA†•	0-125
2000-250PA	0-250
2000-300PA	0-300
2000-500PA	0-500
2000-750PA	0-750
2000-1000PA	0-1000
Zero Center Ranges	
Model	**Range, Pa**
2300-60PA†••	30-0-30
2300-100PA†•	50-0-50
2300-120PA	60-0-60
2300-200PA	100-0-100
2300-250PA	125-0-125
2300-300PA	150-0-150
2300-500PA	250-0-250
2300-1000PA	500-0-500

Model	Range, kPa
2000-0.5KPA	0-0.5
2000-1KPA	0-1
2000-1.5KPA	0-1.5
2000-2KPA	0-2
2000-2.5KPA	0-2.5
2000-3KPA	0-3
2000-4KPA	0-4
2000-5KPA	0-5
2000-8KPA	0-8
2000-10KPA	0-10
2000-15KPA	0-15
2000-20KPA	0-20
2000-25KPA	0-25
2000-30KPA	0-30
Zero Center Ranges	
2300-1KPA	.5-0-.5
2300-2KPA	1-0-1
2300-2.5KPA	1.25-0-1.25
2300-3KPA	1.5-0-1.5

Dual Scale Air Velocity Units
For use with pitot tube

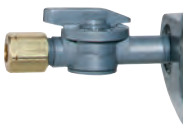
Model	Range in W.C./ Velocity F.P.M.
2000-00AV†••	0-.25/300-2000
2000-0AV†•	0-.50/500-2800
2001AV	0-1.0/500-4000
2002AV	0-2.0/1000-5600
2005AV	0-5.0/2000-8800
2010AV	0-10/2000-12500

Dual Scale English/Metric Models

Model	Range, in w.c.	Range, Pa or kPa
2000-00D†••	0-.25	0-62 Pa
2000-0D†•	0-0.5	0-125 Pa
2001D	0-1.0	0-250 Pa
2002D	0-2.0	0-500 Pa
2003D	0-3.0	0-750 Pa
2004D	0-4.0	0-1.0 kPa
2005D	0-5.0	0-1.25 kPa
2006D	0-6.0	0-1.5 kPa
2008D	0-8.0	0-2.0 kPa
2010D	0-10	0-2.5 kPa
2015D	0-15	0-3.7 kPa
2020D	0-20	0-5 kPa
2025D	0-25	0-6.2 kPa
2050D	0-50	0-12.4 kPa
2060D	0-60	0-15 kPa

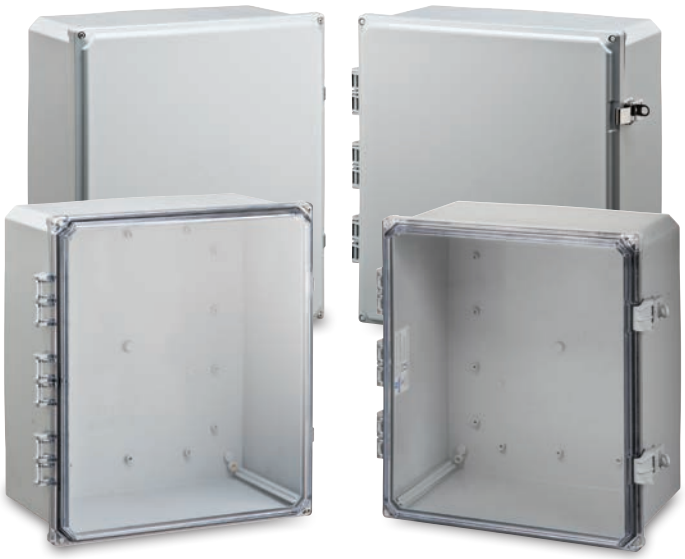
VELOCITY AND VOLUMETRIC FLOW UNITS
Scales are available on the Magnehelic® that read in velocity units (FPM, m/s) or volumetric flow units (SCFM, m^3/s, m^3/h). Stocked velocity units with dual range scales in inches w.c. and feet per minute are shown above. For other ranges contact the factory.
When ordering volumetric flow scales please specify the maximum flow rate and its corresponding pressure. Example: 0.5 in w.c. = 16,000 CFM.

ACCESSORIES
A-321, Safety Relief Valve
A-448, 3-piece magnet kit for mounting Magnehelic® gage directly to magnetic surface
A-135, Rubber gasket for panel mounting
A-401, Plastic Carry Case

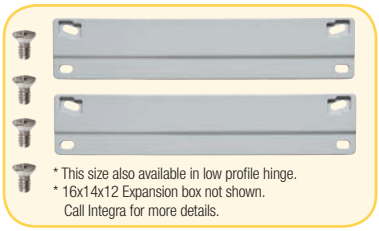


A-310A 3-Way Vent Valves
In applications where pressure is continuous and the Magnehelic® gage is connected by metal or plastic tubing which cannot be easily removed, we suggest using Dwyer A-310A vent valves to connect gage. Pressure can then be removed to check or re-zero the gage.

16X14X7 PREMIUM LINE



Comes with feet or flanges



* This size also available in low profile hinge.
* 16x14x12 Expansion box not shown.
Call Integra for more details.

ECO FRIENDLY

MADE IN THE USA

PREMIUM POLYCARBONATE ENCLOSURE

Features and Benefits

- Standard color – light gray with a gloss finish.
- Best material – bases, opaque covers and clear covers are all made of high-impact, UV resistant polycarbonate.
- Easy ordering – one part number includes base, lid, mounting feet or flanges and all lid fastening hardware (mounting panels sold separately).
- Flexible interior mounting – features the unique and patented Integra adjustable depth "T-Rail" back panel mounting system (back panel and adjustable brackets sold separately).
- Features multiple bosses for easy installation of devices and DIN rails.
- UL-50 / c-UL Listed (files # E229365, # E207562)

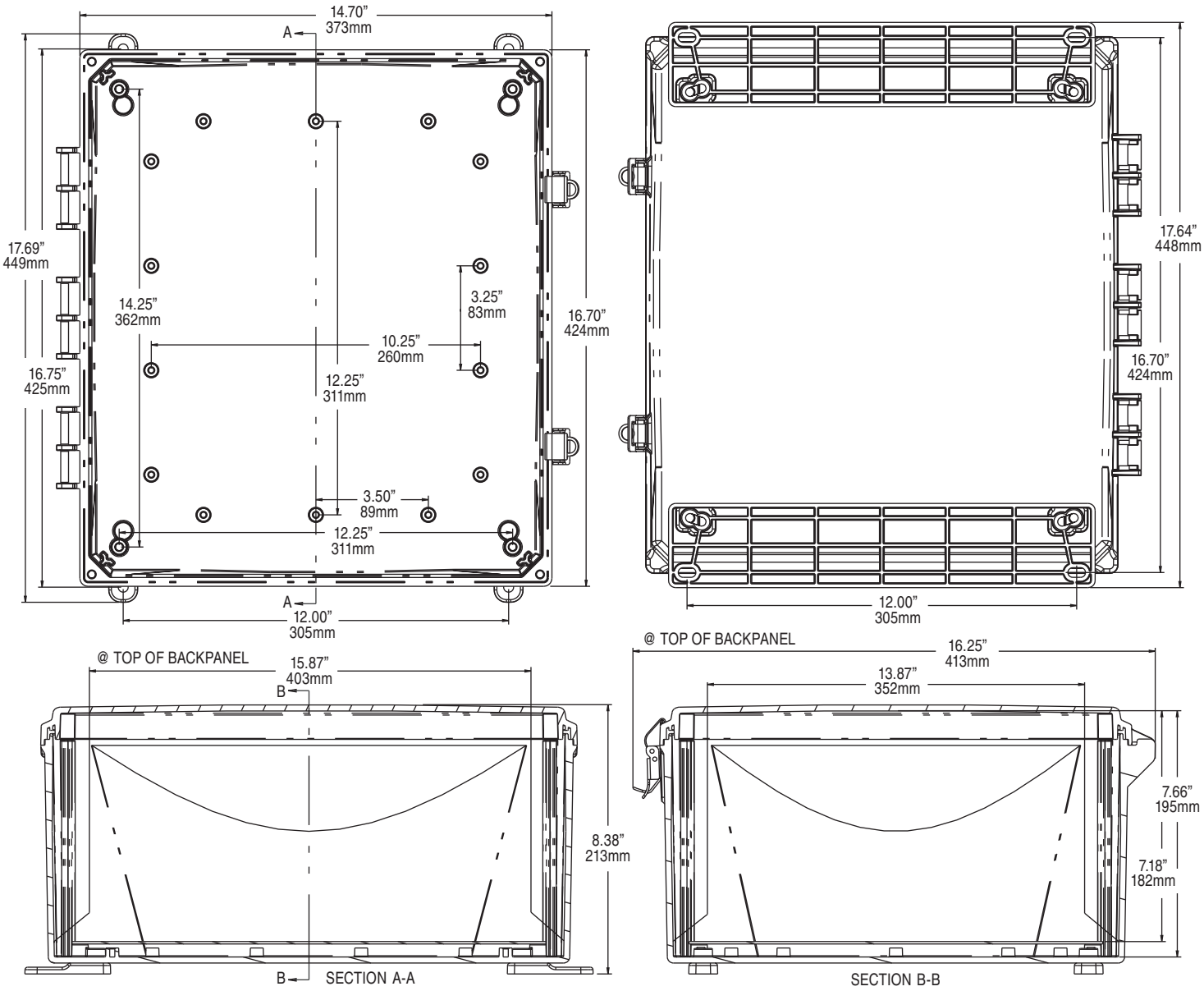
Our Premium Line enclosures are the most durable, non-metallic Nema UL rated enclosures available. From the extremely versatile mounting options inside the enclosure to having the most off-the-shelf accessories, the Integra "Made In the USA" Premium Line enclosures provide great value to any application.

Mechanical and Thermal	Test Spec.	Unit	Premium Line
Instrumented Dart Impact @ 73° F		in/lb.	565
Falling Ball Impact @ 73° F	UL-746	in/lb.	900
Deflection Temperature @ 264 psi	ASTM D648	Deg. F	270
Modulus of Elasticity	ASTM D790	ksi	340
Temperature Range		Deg. F	-40 to 265
Flammable / UV Ratings	**Test Spec.**	**Unit**	**Premium Line**
Flame Rating - UL	UL 94	-	5VA
Outdoor UV Exposure	UL	-	F1

Atex pending, contact factory for details

161407 P/N	4X IP66	6P IP68	Hinged Cover	Screw Cover	Opaque Cover	Clear Cover	Mounting Feet	Mounting Flange	Stainless Steel Locking Latch	Non-Metallic Locking Latch
H161407S	✓	✓		✓	✓		✓			
H161407SC	✓	✓		✓		✓	✓			
H161407SF	✓	✓		✓	✓			✓		
H161407SCF	✓	✓		✓		✓		✓		
H161407H	✓		✓	✓	✓		✓			
H161407HC	✓		✓	✓		✓	✓			
H161407HF	✓		✓	✓	✓			✓		
H161407HCF	✓		✓	✓		✓		✓		
H161407HLL	✓		✓		✓		✓		✓	
H161407HCLL	✓		✓			✓	✓		✓	
H161407HFLL	✓		✓		✓			✓	✓	
H161407HCFLL	✓		✓			✓		✓	✓	
H161407HNL	✓		✓		✓		✓			✓
H161407HCNL	✓		✓			✓	✓			✓
H161407HFNL	✓		✓		✓			✓		✓
H161407HCFNL	✓		✓			✓		✓		✓
H161407H-6P	✓	✓	✓	✓	✓		✓			
H161407HC-6P	✓	✓	✓	✓		✓	✓			
H161407HF-6P	✓	✓	✓	✓	✓			✓		
H161407HCF-6P	✓	✓	✓	✓		✓		✓		

TORQUE SPECIFICATIONS - Mounting Brackets - 1/4"-20 x 0.25 SS, countersunk phillips drive screws (torque limit = 20 in. lbs.) | **Covers / Doors** - Torque for corner screws is 10 in. lbs.



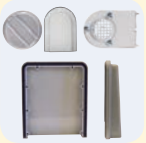
Register online to download this drawing off the Integra website at www.integraenclosures.com | Your company's logo or other information on the lid. Consult factory for details.

Accessories for 16x14x7 (For complete accessories, see page 49-52)

Back Panels
ABP1614 - Aluminum panel
SBP1614 - Steel panel
PVCBP1614 - PVC panel

Aluminum Swing Out Panels
ABP-1614USP/USOPK - Complete panel kit
ABP-1614USP - Aluminum swing out panels only
USOPK - Hardware only

Back Panel Adjustment Kit
BPAKG - Gray, Set Screw
BPAKB - Black, Set Screw
UBPAKG - Gray, Thumb Screw
UBPAKB - Black Thumb Screw



Air Vents / Fan Shrouds
VENT 3 - 3" Aluminum louvered
VENT 2 - Outdoor labyrinth
FS KIT1 - 1 piece kit
FS KIT2 - 2 piece kit
Specifications on page 47

Steel Swing Out Panels
SBP-1614USP/USOPK - Complete panel kit
SBP-1614USP - Steel swing out panels only
USOPK - Hardware only

Cord Grips
IP68/NEMA 4X/6P rated
See page 53 for more details and part numbers.

Din Rail
DIN 14 - 2 rails, 4 screws

Pole Mounting Kit
PMKG-214 - 2" pole
PMKG-314 - 3" pole
PMKG-414 - 4" pole
PMKG-1214 - 12" pole

Mounting Feet & Flange Kits
MFKG - Premium line feet
MFKSS - Stainless steel feet
MFLK14 - 14" Flange kit

Vapor Guardian 5500®

Dynamic Controls and Remote Management

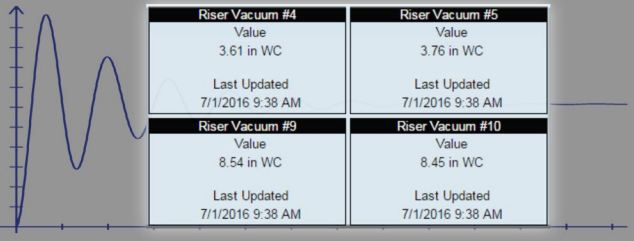
Backed by 30 Years of Mitigation Experience

Key Features

+ Save up to 90% on power consumption
+ Remotely manage 10 dynamically controlled blower systems
+ Remotely control sub-slab pressures to tolerance of 0.001 ”w.c.
+ Remotely monitor up to 45 additional performance metrics
+ Login and view system performance in real-time
+ Automated Email and text alerts
+ Automated quarterly and annual performance reports

Specification

Outputs to Control Blowers	10	Height	11.8"
Inputs for Sensors	45	Length	11.8"
Sensor Input Voltage	0-5V, 0-10V	Width	5.2"
RS485 Port for Modbus Comm.	1		
Powered by	120VAC or 24VDC		



www.vapordynamics.com · (908) 362-7291

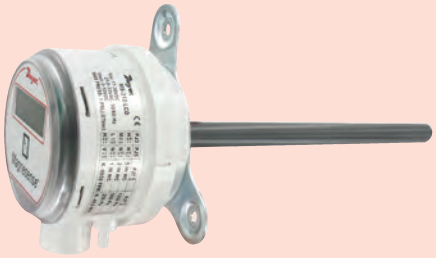
Series MS

Magnesense® Differential Pressure Transmitter

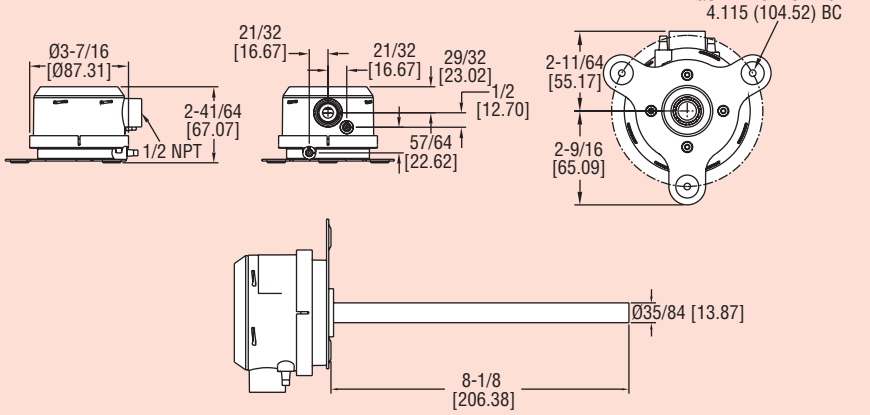
Monitors Pressure & Air Velocity

CE

Standard MS with optional LCD



MS with optional LCD and static probe



The Series MS Magnesense® Differential Pressure Transmitter is an extremely versatile transmitter for monitoring pressure and air velocity. This compact package is loaded with features such as:

- Field selectable English or Metric ranges
- Field upgradeable LCD display
- Adjustable damping of output signal (with optional display)
- Ability to select a square root output for use with pitot tubes and other similar flow sensors

Along with these features, the patented magnetic sensing technology provides exceptional long term performance and enables the Magnesense® Differential Pressure Transmitter to be the single solution for your pressure and flow applications.

Model	Output	Selectable Ranges
MS-121*	4-20 mA	0.1″, 0.25″, 0.5″ w.c. (25, 50, 100 Pa)
MS-321*	0-10 V	0.1″, 0.25″, 0.5″ w.c. (25, 50, 100 Pa)
MS-721*	0-5 V	0.1″, 0.25″, 0.5″ w.c. (25, 50, 100 Pa)
MS-111*	4-20 mA	1″, 2″, 5″ w.c. (250, 500, 1250 Pa)
MS-311*	0-10 V	1″, 2″, 5″ w.c. (250, 500, 1250 Pa)
MS-711*	0-5 V	1″, 2″, 5″ w.c. (250, 500, 1250 Pa)
MS-131	4-20 mA	10″ w.c. (2 kPa)
MS-141	4-20 mA	15″ w.c. (3 kPa)
MS-151	4-20 mA	25″ w.c. (5 kPa)
MS-331	0-10 V	10″ w.c. (2 kPa)
MS-341	0-10 V	15″ w.c. (3 kPa)
MS-351	0-10 V	25″ w.c. (5 kPa)
MS-021	4-20 mA	±0.1″, 0.25″,0.5″ w.c. (±25, 50, 100 Pa)
MS-221	0-10 V	±0.1″, 0.25″,0.5″ w.c. (±25, 50, 100 Pa)
MS-621	0-5 V	±0.1″, 0.25″,0.5″ w.c. (±25, 50, 100 Pa)

OPTIONS

Note: Add -LCD to end of model for units with display.
*Models available with duct mount static pressure probe. Change last digit from 1 to 2. Ex. MS-122

Add suffix -NIST to end of model numbers for NIST traceable calibration certificate. Example: MS-021-NIST.

Add suffix -FC to end of model numbers for factory calibration certificate. Example: MS-021-FC.

SPECIFICATIONS

Service: Air and non-combustible, compatible gases.
Wetted Materials: Consult factory.
Accuracy: ±1% for 0.25″ (50 Pa), 0.5″ (100 Pa), 2″ (500 Pa), 5″ (1250 Pa), 10″ (2 kPa), 15″ (3 kPa), 25″ (5 kPa) ±2% for 0.1″ (25 Pa), 1″ (250 Pa) and all bi-directional ranges.
Stability: ±1% / year FSO.
Temperature Limits: 0 to 150°F (-18 to 66°C).
Pressure Limits: 1 psi maximum, operation; 10 psi, burst.
Power Requirements: 10 to 35 VDC (2-wire); 17 to 36 VDC or isolated 21.6 to 33 VAC (3-wire).
Output Signals: 4 to 20 mA (2-wire); 0 to 5 V, 0 to 10 V (3-wire).
Response Time: Adjustable 0.5 to 15 sec. time constant. Provides a 95% response time of 1.5 to 45 seconds.
Zero & Span Adjustments: Digital push button.
Loop Resistance: Current output: 0-1250 Ω max; Voltage output: min. load resistance 1 kΩ.
Current Consumption: 40 mA max.
Display (optional): 4 digit LCD.
Electrical Connections:
4-20 mA, 2-Wire: European style terminal block for 16 to 26 AWG.
0-10 V, 3-Wire: European style terminal block for 16 to 22 AWG.
Electrical Entry: 1/2″ NPS thread.
Accessory (A-151): Cable gland for 5 to 10 mm diameter cable.
Process Connections: 3/16″ ID tubing (5 mm ID). Maximum OD 9 mm.
Enclosure Rating: NEMA 4X (IP66).
Mounting Orientation: Diaphragm in vertical position.
Weight: 8.0 oz (230 g).
Agency Approvals: CE.

ACCESSORIES

A-435, Field Upgradeable LCD
A-480, Plastic Static Pressure Tip
A-481, Installer kit. Includes 2 plastic static pressure tips and 7 ft (2.1 m) of PVC tubing
A-489, 4″ Straight Static Pressure Tip with Flange
A-302F-A, 303 SS Static Pressure Tip with mounting flange. For 3/16″ ID rubber or plastic tubing. 4″ insertion depth. Includes mounting screws
SCD-PS, 100 to 240 VAC/VDC to 24 VDC Power Supply

See page 567 for process tubing options.

CLEAN VAPOR LLC
V.O.C. & RADON PLAN DESIGN AND REMEDIATION

July 17, 2018

Ms. Liz Porter, PG, PMP
Senior Project Manager/Vice President
S&ME
6515 Nightingale Lane
Knoxville, TN 37909

RE: Vapor Intrusion Mitigation System Installation
Former Sanitary Laundry, 625 N. Broadway, Knoxville, Tennessee

Dear Ms. Porter,

Clean Vapor, LLC is pleased to respond to your request to install a vapor intrusion mitigation system located at 625 N. Broadway, Knoxville, Tennessee. Our price quote is to facilitate and install the mitigation system as shown in the July 13, 2018, Vapor Intrusion Mitigation Plan Design prepared by Clean Vapor. The price is inclusive of all work specified including labor, materials, travel, electric, sub contract roofing and preparing the commissioning report. The cost of the installation of the remote management system and one year of electronic monitoring is included. S&ME will provide testing and disposal of sub slab soil tailings. The time required to install and commission this system is estimated to be two to three weeks. We have not yet secured a price on the city permits and this cost has been estimated at $ 500.00.

Cost to Install Vapor Intrusion Mitigation System: $ 127,300.00

To be provided by others prior to the start of work:

- An energized electric panel to power the blowers and monitoring system
- Running water
- Contact information for the roofing company that holds the current warranty

TERMS OF PAYMENT:

NET 30 DAYS. THE MOBILIZATION AND INITIAL MATERIALS PAYMENT (25%) WILL BE INVOICED UPON SIGNING THE AGREEMENT AND WILL BE DUE AT THE OUTSET OF THE PROJECT. ALL DESIGNS AND PREVIOUS INVOICES MUST BE PAID IN FULL PRIOR TO THE START OF WORK. THE REMAINING BALANCE WILL BE BILLED ACCORDING TO A SCHEDULE OF VALUES. PAYMENTS SHALL BE PAID WITHIN 30 DAYS OF EACH INVOICE. EXTENDED TERMS BEYOND 30 DAYS WILL INCREASE THE COST OF QUOTED SERVICES BY 0.06 PERCENT PER DAY OR BY 1.8 PERCENT PER MONTH.

ACCEPTANCE OF AGREEMENT:

When you return this proposal with your signature, it shall constitute a contract for performance of work.

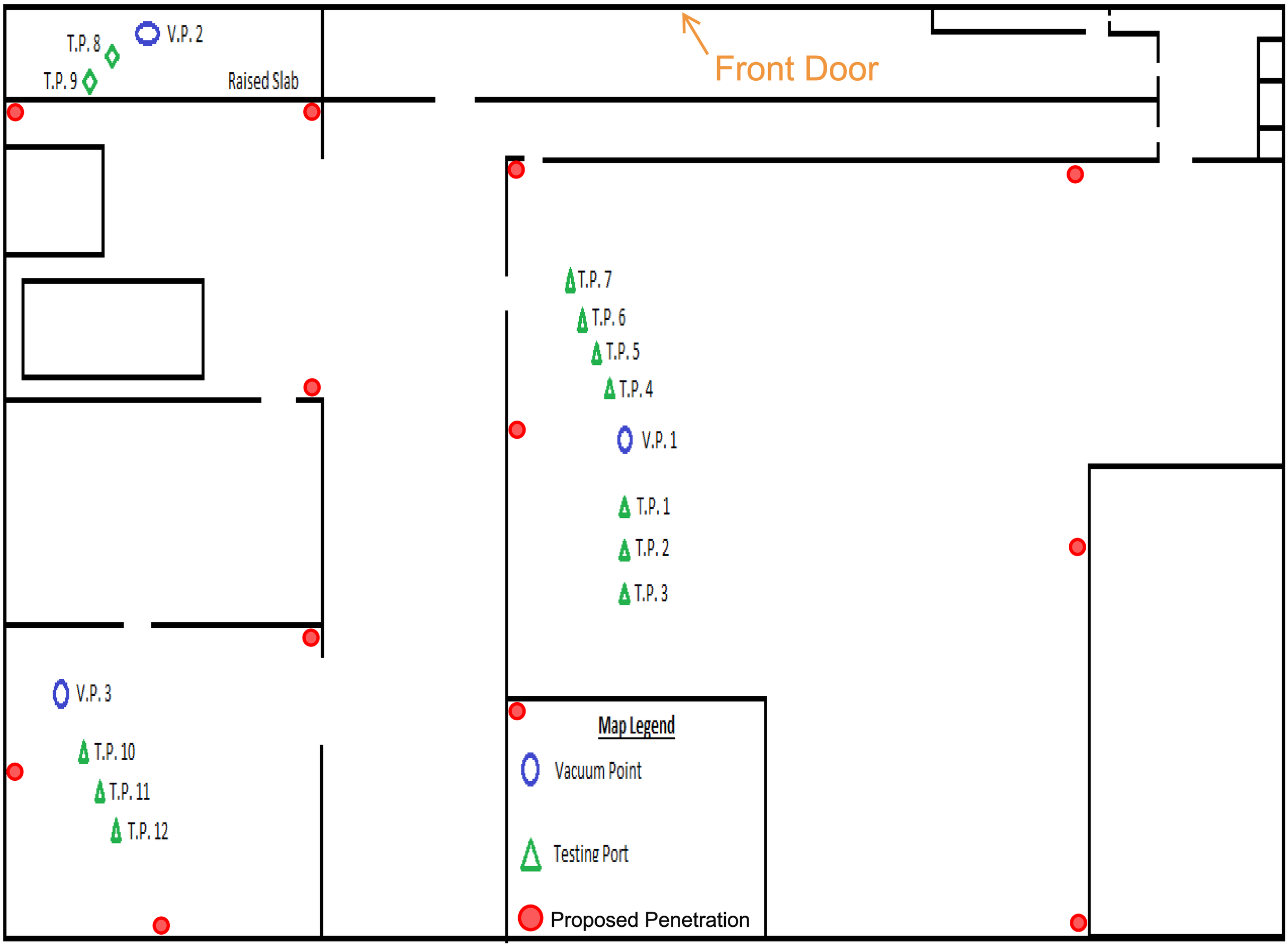
Contract submitted for Clean Vapor LLC by:

Prepared by: _____ Date: _____
Hatton, for CLEAN VAPOR, LLC

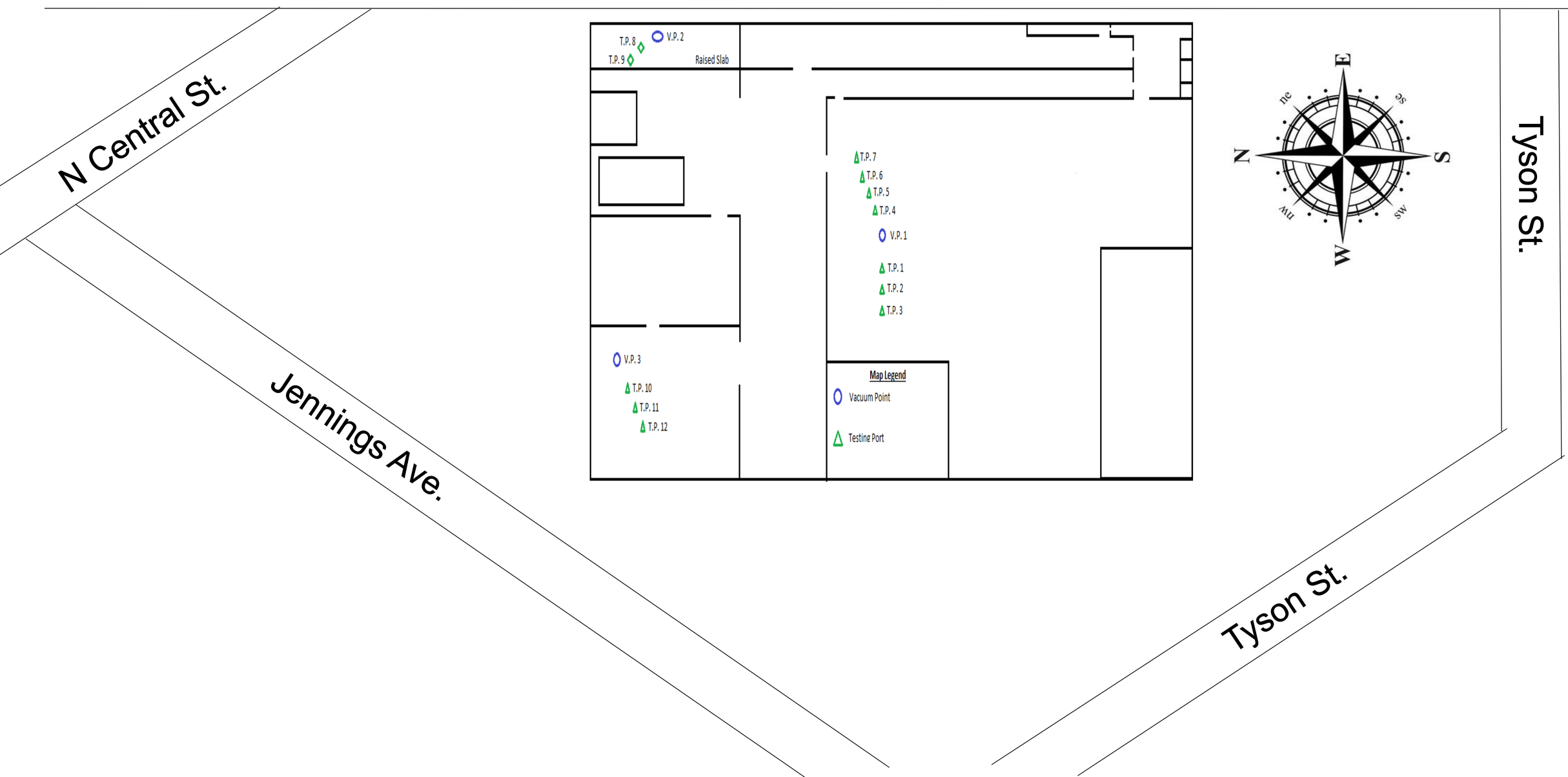
Accepted by: _____ Date:_____
Porter, for S&ME

NASHVILLE 615-988-1515 * KNOXVILLE 865-245-4515 * CHATTANOOGA 423-790-0368

625 North Broadway Knoxville, TN 37917



N Broadway



*NASHVILLE 615-988-1515 *KNOXVILLE 865-245-4515 *CHATTANOOGA 423-790-0368

Communication Test

625 North Broadway

Knoxville, TN 37917

	Testing Port	Open Inches W.C.	With Choke (10") Inches W.C.	With Choke (5") Inches W.C.
Main Slab	T.P. # 1	-0.053		
	T.P. # 2	0.000		
	T.P. # 3	0.000		
	T.P. # 4	-0.020		
	T.P. # 5	0.000		
	T.P. # 6	0.000		
	T.P. # 7	0.000		
Raised Slab	T.P. # 8	-0.011		
	T.P. # 9	0.000		
Basement	T.P. # 10	-0.117	-0.057	-0.005
	T.P. # 11	-0.158	-0.076	-0.034
	T.P. # 12	-0.079	-0.042	-0.007

Appendix VI – Remediation Subcontractor Quotes

INVOICE

APPLICATION FOR PAYMENT

From:	To:	Project:	Application No.:
Clean Vapor, LLC	S&ME	Former Sanitary Laundry	**Invoice No:**
P.O. Box 688	6515 Nightingail Lane	Knoxville, TN	Invoice Date:
Blairstown, NJ 07825	Knoxville,TN 37909		Period From:
			Period To:
Remit Payment to above Address			Project / Contract No:
	Payment Terms: Due on Receipt	Contract For: Vapor Intrusion Piping	Contract Date:

CONTRACTOR'S APPLICATION FOR PAYMENT

1. ORIGINAL CONTRACT SUM	$ 127,300.00	
2. Net Change By Change Orders		
3. CONTRACT SUM TO DATE	$ 127,300.00	
4. TOTAL COMPLETED AND STORED TO DATE		
5. RETAINAGE		
a. 0% of Completed Work		
b. 0% of Stored Material		
Total Retainage		
6. TOTAL EARNED LESS RETAINAGE		
7. LESS PREVIOUS PAYMENT(S) Line #6		
8. CURRENT PAYMENT DUE		
9. BALANCE TO FINISH, INCLUDING RETAINAGE		

CHANGE ORDER SUMMARY	ADDITIONS	DEDUCTIONS
Total of Previous Approved Changes		
Total Approved Changes This Month		
TOTALS		
NET CHANGES by Change Order		

The undersigned certifies that to the best of his/her knowledge, information and belief the work covered by this invoice has been completed in accordance with the contract documents, that all amounts have been paid for Work for which previous invoice(s) were issued and payments received, and that current payment shown herein is now due.

By: *Thomas E. Hatton* Date: 7/20/2018

State of: County of:

Subscribed and sworn to before me this day of

Notary Public: Commision Expires:

INVOICE

SCHEDULE OF VALUES

From:
Clean Vapor, LLC
P.O. Box 688
Blairstown, NJ 07825

To:
S&ME
6515 Nightingail Lane
Knoxville,TN 37909

Project:
Former Sanitary Laundry
Knoxville, TN

Application No.:
Invoice No:
Period From:
Period To:
Project / Contract No:

A	B	C	D	E	F	G		H	I
Item #	Description of Work	Scheduled Value	Work Completed		Materials Presently Stored	Total Completed & Stored To Date	%	Balance To Finish	Retainage
			From Previous Application(s)	This Period					
1	Mobilization and initial Materials	$ 23,000.00				$ -	0%		$ -
2	Suction Point and Soil Excavation	$ 13,210.00				$ -	0%	$ -	$ -
3	Risers, Piping, Core Cutting, etc.	$ 15,090.00				$ -	0%		$ -
4	Sealing	$ 4,200.00				$ -	0%		$ -
5	Balancing Valves	$ 1,700.00				$ -	0%		$ -
6	Safety Plan	$ 2,400.00				$ -	0%		$ -
7	Vacuum Guages	$ 1,600.00				$ -	0%		$ -
8	Blowers and Stands	$ 9,200.00				$ -	0%		$ -
9	Motor Controls & Monitoring	$ 12,900.00				$ -	0%		$ -
10	Start up and Balance	$ 2,600.00				$ -	0%		$ -
11	Overhead Piping	$ 16,700.00				$ -	0%		$ -
12	Safety Expendables	$ 1,200.00				$ -	0%		$ -
13	Electric & Permits	$ 9,300.00				$ -	0%		$ -
14	Sensor Ports and Embedded Probes	$ 3,000.00				$ -	0%		$ -
15	Roof Coring and Sealing	$ 1,600.00				$ -	0%		$ -
16	Final Report	$ 3,000.00				$ -	0%		$ -
17	Electric Metering	$ 1,800.00				$ -	0%		$ -
18	Demobilzation	$ 4,800.00				$ -	0%		$ -
19						$ -	0%	$ -	$ -
20						$ -	0%	$ -	$ -
21						$ -	0%	$ -	$ -
22						$ -	0%	$ -	$ -
23						$ -	0%	$ -	$ -
24						$ -	0%	$ -	$ -
25						$ -	0%	$ -	$ -
26						$ -	0%	$ -	$ -
27						$ -	0%	$	$ -
28						$ -	0%	$	$ -
29						$ -	0%	$ -	$ -
	TOTAL:	**$ 127,300.00**	**$ -**		**$ -**	**$ -**	**0%**	**$ -**	**$ -**

ESTIMATE

Radon 1

1905 21st Ave. South
Nashville, Tennessee 37212
615-988-1515

TOTAL **$36,000.00**

Liz Porter
625 North Broadway
Knoxville, TN
37917

Estimate#	EST-000026
Estimate Date	Thursday, November 29, 2018

#	ITEM & DESCRIPTION	AMOUNT
1	Passive Sub-Slab Vent System Achieving communication was a struggle at this site. Obstacles such as cork composites underneath the slabs, as well as penetrations and broken concrete, allowed PFE to diminish or added restrictions that cut off airflow. Little to no aggregate was found in many of the test locations. However, with a vacuum of 33 in.w.g, we could at least establish that a sub slab depressurization system is possible in most parts of the building. At this point, without power in the building, these systems are proposed as passive systems that can be activated at a future date. Each riser will consist of a 15-20 gallon pit of aggregate removed from the slab. SM&E shall supply barrels if contaminated material is to be contained upon removal. 4 inch schedule 40 PVC pipe will run from each extraction point, up the levels of structure, and through the roof. Roof penetrations will be sealed to prevent leaks.	$36,000.00 12.00 x 3,000.00

Does not include system activation.

Sub Total	36,000.00
Total	**$36,000.00**

Terms & Conditions

Payment is due upon completion of installation.

ESTIMATE

Radon One

1905 21st Ave. South
Nashville, Tennessee 37212
615-988-1515

TOTAL **$43,200.00**

Liz Porter
625 North Broadway
Knoxville, TN
37917

Estimate#	EST-000029
Estimate Date	Tuesday, December 04, 2018
Reference#	S&ME-625 North Broadway VOC

#	ITEM & DESCRIPTION	AMOUNT
1	Activation of Passive Sub-Slab Vent System If desired levels are not achieved with passive design, the system will be activated by installing multiple blowers to depressurize the sub-slab area. The blowers utilized will be explosion proof rated. Fans will be placed on the roof of the building at a safe distance away from any HVAC recovery air vents. New pressure field extension map will be drawn to show system pressure field changes. The current condition of concrete slab consists of unsealed penetrations and broken surface area which can cause fluctuations in PFE. As a result, the exact number and model of blowers will be confirmed after initial passive system installation, sealing of concrete slab, and additional testing.	$30,000.00 12.00 x 2,500.00
2	Central Alarm Board & OM&M A central alarm board with visual and audible alarms will be placed in a location agreed upon by contractor and owner. The alarms will sound when a riser fan loses power or drops below .25 in.w.g. An Operations Monitoring and Maintenance booklet will be placed at the alarm board.	$4,200.00 1.00 x 4,200.00
3	Electrical Work Electrical connections will be made by a licensed electrician provided by Radon 1.	$4,200.00 1.00 x 4,200.00
4	Vapor Pins Monitoring ports installed in the slab for future sampling of negative pressure field and contaminant levels.	$4,800.00 24.00 x 200.00

Sub Total	43,200.00
Total	**$43,200.00**

Terms & Conditions

Archived: Friday, September 14, 2018 8:11:59 AM
From: Thomas Hatton
Sent: Friday, August 24, 2018 9:25:05 PM
To: Liz Porter
Cc: Kristin Hatton; Melissa Price
Subject: RE: Knoxville Designs
Importance: Normal
Attachments:
Copy of Knoxville_Schedule of Values.pdf

Liz,

I put together the projects schedule of values.

My thoughts are that we should install the suction points and piping.

Since the project would be broken in two pieces we would charge 50% of the mobilization and demobilization and fulfill task items 2,3,5 and 11. That would be a cost of $60,600.00

I would like for there to be electric power at the site. We will need the water turned back on as we will need it for our core drills.

I'll be awaiting your thoughts.

Best Regards,

Tom,

Thomas E. Hatton
CEO-Project Director
Clean Vapor, LLC

148 State Route 94, PO Box 688, Blairstown, NJ 07825
O: 908-362-5616 F: 908-362-5433
thatton@cleanvapor.com I www.cleanvapor.com

From: Liz Porter <LPorter@smeinc.com>
Sent: Wednesday, August 22, 2018 3:26 PM
To: Thomas Hatton <thatton@cleanvapor.com>
Subject: RE: Knoxville Designs

Hi Tom - Thanks for calling me back today. I look forward to receiving the fee structure for Sanitary Laundry, with a recommendation for the portion of work that can be done while the building is vacant. I also look forward to seeing the new construction system information from the New Jersey site you mentioned.

Thank you!

Liz Porter, PG, PMP
Senior Project Manager/Vice President

S&ME
6515 Nightingale Lane
Knoxville, TN 37909 map
O: 865.970.0003
M: 865.804.4336
lporter@smeinc.com
www.smeinc.com
LinkedIn | Twitter | Facebook

ERC
ENVIRONMENTAL REMEDIATION CONSULTANTS INC.

QUOTATION

Date: May 22, 2018

Customer ID: S&ME

Bill To:

Project Location: 625 North Broadway

Recontainerize & Dispose of Unknown Material

Salesperson	Job #	Delivery Method	Shipping Terms	Service Date	Payment Terms	Due Date
W. France	N/A	Scheduled	Rate Schedule	N/A	Net 30	N/A

Billing is cumulative based on individual date of service: **FOR ESTIMATION PURPOSES ONLY**

Qty (hrs)	Item #	Description	Unit Price	Discount	Line Total
1.00		Recontainerize Labor & Materials	$ 3,355.00	$ 335.50	3,019.50
1.00		Disposal Of Material	$ 2,056.50	$ 85.65	1,970.85
1.00		Special Waste Fee	$ 375.00		375.00
			Total Discount	$ 421.15	
				Subtotal	5,365.35
				Sales Tax	
				Total	**5,365.35**

Make all checks payable to Environmental Remediation Consultants, Inc.

Thank you for your business!

506 Hutcheson Road Seymour, TN 37865 (865) 679-4372